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An Assessment of the Impact of the 34th International Geological Congress (IGC) on Australia

H. Dulfer, M. Haynes, A. Hill, F.J.F. Howard, W. Jiang, V. Miller, R. Norman, R. Romeyn and I. Schroder

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GEOSCIENCE AUSTRALIA

RECORD 2012/78

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Department of Resources, Energy and Tourism

Minister for Resources and Energy: The Hon Gary Gray AO MP

Secretary: Mr Blair Comley, PSM

Geoscience Australia

Chief Executive Officer: Dr Chris Pigram

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Executive Summary

Each International Geological Congress (IGC) is a unique global meeting of geoscientists. Selection to host an IGC is a strongly competitive process and the planning, organisation, administration and implementation of the congress requires a significant national scale investment of resources. By focussing the attention of geoscientists from around the globe onto the host nation, the IGC has the potential to produce extensive benefits at a range of scales; from the national scale, through to the organisational scale, and down to the personal level. The aim of the present study is to investigate the impacts of the 34th International Geological Congress (34th IGC) from several different perspectives in an attempt to capture the impacts at these different scales.

At a national scale the most immediate impact of hosting the 34th IGC was increased tourism revenue, injected into the economy by the large number of delegates and associated visitors. A key driver for any nation bidding to host an IGC is that the IGC provides a forum for showcasing the geoscience of the host country. The value of the 34th IGC as a geoscience showcase was demonstrated by the product release of the Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER) Geoscience Maps of Australia, which gained significant exposure and international recognition through the 34th IGC. A study of published journal articles, recorded in geoscience reference databases, confirmed that journal article publication rates by IGC host countries often increase coincident with the timing of the congresses, though the effect may be relatively short-lived. There was no measurable increase in international collaboration, measured by journal article co-authorship, at the national scale for IGC host nations. On the other hand, the potential for international collaboration through hosting an IGC appears to be important at the personal level and was a strong motivator for attendance at the congress.

The impacts of the 34th IGC at the organisational to the personal scale were investigated through a survey of 34th IGC delegates from Geoscience Australia (GA). GA was an obvious candidate for such a study, given its strong support for the event and the active role taken by the agency in the lead-up to and during the conference. At an agency level, GA was able to showcase its work, products, and capabilities through a wide range of conference activities; including conference presentations and the GA booth. Based on feedback received from delegates at the conference, there was a strong perception amongst GA staff that the national and international reputation of the agency had been greatly enhanced. The 34th IGC also provided GA staff with an opportunity to increase their awareness of current trends in international geoscience and to receive feedback on their own work from the international geoscience community. This opportunity was highly valued by staff and there was a general consensus that the 34th IGC had a positive impact on job satisfaction, professional development, that it facilitated networking with international peers and allowed international collaborations to be developed.

The implementation of the 34th IGC Social Media Plan (Rowland, 2012b) provided an additional opportunity to investigate the impact of the 34th IGC through an evaluation of the effectiveness of social media to engage with congress delegates and the general public at the personal level. Social media was shown to provide a valuable avenue for one-to-many communication with delegates and the public. In particular, it allowed the dissemination of messages, ideas, and scientific information to a widespread international audience in the lead-up to the conference. However, despite its success as a

one-to-many communication tool, its expected use as a medium for communication and interaction amongst delegates during the conference was not fully realised.

Overall, it can be concluded that hosting the 34th IGC within Australia was of great benefit to geosciences within Australia at the national scale, to Geoscience Australia as an organisation, and to the individuals who attended as congress delegates.

1. Introduction

1.1. The International Geological Congress

The IGC, originally the International Congress of Geologists, was founded in 1876. The first IGC was held in Paris, France, in 1878 and since then a total of 34 IGCs has been held in 24 different countries generally at 4 year intervals (International Union of Geological Sciences, 2008). Today the IGC is a general assembly of geoscientists, geologists and Earth-related scientists and is the major scientific forum of the International Union of Geological Sciences (IUGS), which was founded in 1961 to address global geological issues.

The IGC is the pre-eminent global geoscience congress. It provides a forum for geoscientists from around the globe to present scientific results across the whole spectrum of the geosciences to advance fundamental and applied research, as well as exchanging ideas and information. It also facilitates important international business meetings, encourages international networking and provides the opportunity to study the geological features and phenomena of the host nation through field trips.

1.2. Australia's Bid for the International Geological Congress

At the end of each IGC the IUGS announces where the IGC will be held in 8 years time. This process is very competitive and involves the prospective host countries presenting a case (as a document and presentations) that justifies their bid to host an IGC. Australia won its bid to host the 34th IGC on behalf of the Oceania region (including New Zealand) at the IUGS-IGC council meeting held at the IGC in Italy in 2004. This bid was put together by a team led by Dr Neil Williams and Dr Ian Lambert and predominantly composed of GA employees. However, the invitation to hold the 34th IGC at the Brisbane Convention and Exhibition Centre stemmed from a broad consultative process undertaken in 2003 by the Australian Academy of Science in developing the National Strategic Plan for the Geosciences (NCES, 2003). This plan highlighted the value of geoscientists in unlocking Australia's resources and understanding its natural hazards. A serious decline in the university sector was recognised as a major threat to Australia's geoscience capacity and emphasised the need for Australia to take remedial action to re-establish its international reputation and capability in the geosciences.

The Australian Geoscience Council (AGC) was the legal entity responsible for the 34th IGC and endorsed an Australian IGC Organising Committee. This committee comprised prominent academic, government and private sector geoscientists. Many of the committee members were employees of GA for some or all of their time on the committee and included:

- Dr Neil Williams PSM, President of the 34th IGC Organising Committee and former Chief Executive Officer of Geoscience Australia;
- Dr Ian Lambert, 34th IGC Secretary General and former employee of GA;
- Mr Paul Kay, 34th IGC Deputy Secretary General and GA employee; and,

- Dr Lynton Jaques, 34th IGC Scientific Program Committee Chair and former Chief Scientist of GA.

The efforts of these prominent GA employees served as a significant in-kind contribution to the 34th IGC and ensured that GA had a direct input into the direction of the conference, its themes, and programme.

1.3. The 34th International Geological Congress

The 34th International Geological Congress was held in Brisbane between 5 and 10 August 2012. It comprised 6,012 delegates from 112 countries, which demonstrates the global scope of the congress.

The 34th IGC had a very strong representation from Asia-Pacific nations, reflecting both the economic downturn in Europe and the high level of geoscience interest in the Oceania region driven by the growing demand for resources due to the emerging economies in Asia. Therefore, there was a major focus on the private sector, attributed to the fact that Australia was in a mineral economic boom at the time of the IGC. As a result of Australia's importance on the world stage, particularly with respect to resources, there was also a strong interest from politicians around the world.

1.3.1. Scientific Program

The overall theme of the congress was *Unearthing our Past and Future – Resourcing Tomorrow*. This theme reflected the crucial role played by the geosciences in meeting the resource needs of modern society, while sustaining the natural environment. Distinguished speakers were invited to give presentations on major contemporary themes in the geosciences through daily plenary sessions (these can be downloaded at <http://igc.conferenceshare.com.au/>). The themes of the plenary sessions were:

- Resourcing tomorrow: meeting the needs of a growing population;
- Energy in a carbon-constrained world;
- The Earth and man: living with a restless Earth;
- What does the geological record tell us about the Earth's past climates in relation to projected climate change?; and,
- Digital Earth: The information explosion.

The scientific program reflected the extraordinary breadth of the geosciences and included 37 separate themes. The program was developed by the Scientific Program Committee and the Scientific Theme Coordinators and included 3,712 oral presentations and 1,469 poster presentations, requiring a "herculean" effort to schedule within the five days of the congress (Governor of Queensland Penelope Wensley AC, IGC opening ceremony). Additionally, a special addition of *Episodes: Journal of International Geoscience* was produced for the 34th IGC. The special addition contains papers focused on areas that were visited by 34th IGC field trips.

1.3.2. GeoExpo

The 34th IGC provided a rare opportunity for industry, corporations, university research organisations, professional societies and Government departments to engage with the global geoscience community

through GeoExpo, a trade-show style exhibition that ran throughout the congress. The GeoExpo was fully booked with 283 spaces occupied by exhibitors. Food and refreshments served within the GeoExpo ensured that it served as a major hub for delegates and encouraged interaction with the displays.

1.3.3. Workshops and Fieldtrips

A program of 24 professional development workshops and 29 multiple-day field trips held in the Oceania region brought the geology and geoscience issues of the region into global focus. Both workshops and fieldtrips allowed delegates to further their technical skills by working with experts in the relevant fields. They also allowed delegates to apply their knowledge in the geosciences to new areas and expand their professional networks by working with a wide range of new people.

1.3.4. 2nd World YES Congress and the GeoHost Funded Delegate Program

The Young Earth Scientist (YES) Network is 35 years old and the 2nd World YES Congress was held under the umbrella of the 34th IGC. Holding the two events in parallel provided a unique opportunity to attract young Earth scientists from across the globe to the 34th IGC (Figure 1.1). The YES Congress included: a 34th IGC symposium on overcoming geoscience challenges in the 21st Century, early career perspectives on a range of issues, and a suite of evening workshops and roundtable discussions. The GeoHost Funded Delegate Program provided financial support for 244 delegates to attend and participate in the 34th IGC (140 also participated in training workshops). Priority was given to geoscientists from developing countries and young Earth scientists who otherwise would not have had the means to attend the conference.



Figure 1.1: Map showing the number of YES Network delegates with their respective countries that participated in the 2nd World YES Congress.

1.4. Geoscience Australia's Involvement in the 34th IGC

Australia's position as the host of the 34th IGC provided a rare opportunity to focus global attention on the geology of Australia, provide a forum for discussing Australia's geoscientific issues and for promoting its resources. GA seeks to create, maintain and disseminate geoscientific knowledge for the

future well-being of all Australians, as well as stimulating economic growth for the region. As a consequence, it was anticipated that involvement in the 34th IGC would help GA to fulfil its mandated objectives and promote its work to the global geoscience community. GA was a major partner in securing the bid of the 34th IGC, as well as taking major roles in promoting and organising the congress. Although GA staff members featured prominently on the 34th IGC Organising Committee (see [Section 1.2](#)), the total contribution of the organisation extended well beyond this. A non-exhaustive summary of the contribution by GA to the 34th IGC includes the following activities:

- Promoting the 34th IGC at major conferences around the globe in the years leading up to the 34th IGC;
- Sending 120 delegates to the 34th IGC;
- Providing GA employees to organise themes and chair sessions ([Appendix Three](#));
- Producing the official congress volume, a book entitled *Shaping A Nation: A Geology of Australia*; and,
- Contributing to the special addition of *Episodes: Journal of International Geoscience*.

In addition, the congress provided an opportunity for information harvesting and collaborations, ensuring that GA scientists continue to apply best-practices and innovative solutions to Australia's geoscientific problems and provide high-quality information to the Australian Government.

GA also maintained a strong physical presence at the 34th IGC through its GeoExpo booth. The GA booth aimed to promote geosciences within Australia to the global delegate congregation. The display contained; an interactive 3D viewer for spatial data, computers with access to the public GA website, pamphlets containing information on the capabilities of GA, and copies of *Uluru and Kata Tjuta: a geological guide* ([Figure 1.2](#)). In addition, the booth contained a sales centre, which sold copies of the book '*Shaping a Nation: A Geology of Australia*'.

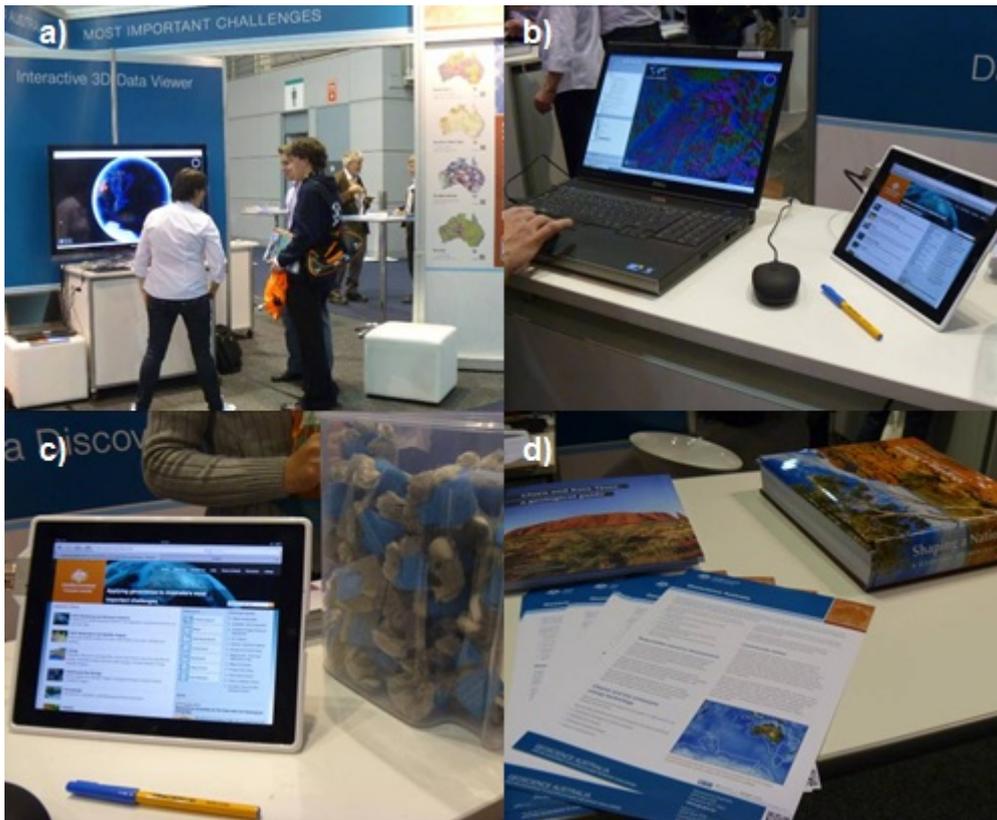


Figure 1.2: Photographs of display items within the GA booth. a) A GA employee showing two delegates GA's 3D Data Viewer using the Kinetic Data Explorer b) Computers with access to the GA website and 3D Data Viewer c) Computer with access to the GA website and free koalas that were very popular with international delegates d) Pamphlets, Uluru and Kata Tjuta: a geological guide and Shaping a Nation: A Geology of Australia which were all available at the GA booth.

1.5. Summary

The IGC is the pre-eminent global geoscience congress. Since Australia won its bid to host the 34th IGC in 2004, a huge effort has gone into the planning, organisation, administration and implementation, sustained over the intervening eight years before the congress. This represents a significant investment into the geosciences of the nation and this investment will now be investigated on a national, organisational and personal level in the following chapters.

2. National-Scale Impacts

2.1. Introduction

The vast scale of the IGC leads to the expectation that it will produce observable impacts, at the national scale, for the country which plays host to it. Despite the costs associated with hosting an IGC, there is strong competition between countries to win the right. The focus of this chapter is to investigate the national-scale impacts that result from hosting an IGC to establish the benefits of hosting such an event.

Hosting an IGC has been purported to have many wide-reaching benefits, extending from the personal to the national scale. For example, Dr Clinton Foster (Chief Scientist, Geoscience Australia) and Dr Ian Lambert (34th IGC Secretary General) described anecdotal broad-scale impacts of hosting the 25th IGC in Sydney in 1976, including:

- An increase in international collaboration, including networking and joint research programs; and,
- A rise in resource exploration in Australia (although other contributing factors also had an impact).

In order to assess whether these impacts were observed for other sessions of the IGC ([Table 2.1](#)), the Secretary Generals of the 32nd IGC in Florence in 2004 and the 33rd IGC in Oslo in 2008—Professor Ernesto Abbate and Dr Anders Solheim respectively—were interviewed. Their positions as Secretary General of past IGCs allowed them to comment on the longer term impacts in their countries. These interviews proved extremely useful in guiding the scope of investigation for the present study and will be referred to in subsequent sections. This approach was based on the hypothesis: the benefits observed by host nations for previous IGCs would provide a guide for the longer term impacts to be expected from the 34th IGC in Brisbane 2012, which are ongoing and could not be measured directly.

Table 2.1: List of host country with the year they hosted an IGC from present to 1976.

IGC Year	Host Country
2012	Australia
2008	Norway
2004	Italy
2000	Brazil
1996	China
1992	Japan
1989	USA
1984	USSR
1980	France
1976	Australia

Therefore, much of this chapter focuses on the trends observed for the last few IGCs as a proxy for the Australian IGC in 2012. To date, the reported benefits of hosting an IGC have only been described anecdotally, with little to no attempt to thoroughly document or quantitatively measure them. Undoubtedly, the reason for this is that measuring national-scale impacts resulting from a conference is not a simple task to achieve. The present study attempts to address this challenge.

2.2. Showcasing Geoscience

A clear reason for countries to bid to host an IGC is the opportunity to showcase their country's geoscience, including access to resource opportunities and promote scientific collaboration. More specifically, showcasing geoscience entails increased exposure as well as recognition of the country's geology and scientific research efforts. Such a large a congregation of scientific minds from around the world has the capacity to enhance geoscience research and focus wide-ranging experiences to shed light on the country's geological features. It was not possible to directly measure the benefit of hosting an IGC as a showcase for the host nation's geoscience, as this is an intangible quality. However, many of the 34th IGC delegates from GA have highlighted a perceived boost for Australia in terms of promoting our geological and technical expertise to the international community. Indirectly, it can be reasoned that as showcasing the geoscience of the host nation continues to perpetuate as a key driver in successive IGC bids, there may be a general recognition of the value of hosting an IGC as a showcase which successive nations are seeking to emulate.

2.2.1. Case Study: ASTER Geoscience Map of Australia Product Release

A national-scale ASTER (Advanced Spaceborne Thermal Emission and Reflection Radiometer) Geoscience Map of Australia was released at the 34th IGC. This involved a media release one evening; promotion of the maps by Dr Thomas Cudahy during the last Plenary Session; and numerous talks presented within sessions during the conference. The ASTER product release provides a practical example of how the 34th IGC was used to showcase Australian geoscience on the international stage. The online downloads of the ASTER Geoscience Map of Australia provide an indication of the rate of uptake of the product following the release. In the relatively short period following its release on 7 August until 5 September, the ASTER product received extensive interest spanning across the globe (Figure 2.1). The international utilisation of the ASTER product was gauged by geocoding IP addresses which were used to access the product through the AuScope Discovery Portal (a total of 123 out of 234 IP addresses were geocoded).



Figure 2.1: The worldwide distribution of traceable IP addresses accessing the ASTER Geoscience Map of Australia data (ANZLIC identifier: ANZCW0703016275) through the AuScope Discovery Portal (<http://portal.auscope.org/portal/gmap.html>).

However, it is important to note that this data only represents a subset of the usage of the ASTER product and the overall utilisation of the product is likely much greater than this data suggests. Around half of the IP addresses could not be tracked, and given that China had the second largest delegation at the 34th IGC, after Australia, it seems likely that the usage in China is underestimated (possibly due to the popularity of virtual private networks, which conceal the IP address of the user). In addition, the AuScope Discovery Portal has not been the only way to access the ASTER product; they can also be accessed through Geoscience Australia’s 3D Data Viewer and through the Western Australian Centre of Excellence for 3D Mineral Mapping.

With the limitations of the usage data in mind, it is nevertheless impressive that there has been such widely distributed interest in the ASTER Geoscience Map of Australia in the short period following the release. This global interest cannot be unambiguously attributed to the 34th IGC because it is impossible to estimate how the product would have been received were it not launched at the 34th IGC. Clearly, there may have been many interested parties who were aware of the potential of the product and would have been engaged regardless of the medium of its release. However, given the high profile exposure of the ASTER product at the 34th IGC and its rapid utilisation across the globe, it seems reasonable to conclude that the 34th IGC has had a beneficial impact in launching the product to a broad audience.

2.3. Networking

The 32nd and 33rd IGC Secretary Generals, Professor Abbate and Dr Solheim respectively, explained that the IGC fostered direct collaboration and networking amongst delegates, as well as reinforcing ongoing or existing activities and partnerships. For example, Professor Abbate believes the 32nd IGC strengthened communication between Italian academia and government research institutions. In addition, Dr Solheim described an example of an external deal facilitated by the 33rd IGC. Specifically, the 33rd IGC provided the venue and was a catalyst for signing a Memorandum of Understanding (MOU) for a four year cooperative research programme between China and the Norwegian Geotechnical Institute (NGI). However, Dr Solheim suggests this outcome would have occurred

regardless of the 33rd IGC, as the Norwegian Minister of Foreign Affairs had funding to form partnerships with five to six developing countries, and that the 33rd IGC merely expedited the decision.

With the exception of partnerships formed during an IGC, it is very difficult to track agreements or collaborative work and attribute them to an IGC, as there are often lead times of many months. Nonetheless, a case study has been undertaken to determine whether hosting an IGC has a measurable impact on collaboration between research scientists at the national scale that might result from networking at an IGC, using information gathered from past IGCs.

2.3.1. Case Study: International Collaboration

Anecdotally, one of the main benefits espoused by delegates of previous IGCs (amongst other conferences) is the opportunity to build international professional networks and collaborative opportunities. However, little is known about whether such personal impacts are also reflected on the national scale. That is, does hosting an IGC have a measurable impact on international collaboration within the geosciences for the host country?

Traditionally, international collaboration has been measured bibliometrically; comparing ratios of papers with authors listed from only one country to those papers with authors from two or more countries. Katz and Martin (1997) conducted a review on research into collaboration between scientists and concluded that co-authorship can never be a truly accurate reflection of collaboration. Their analysis, however, was somewhat tangential to the real problem, as it would obviously be imprudent for any study to accept co-authorship as a perfect measure of a rather abstract concept. Rather, the question that needs to be addressed is whether co-authorship captures the trends in collaboration. For example, if a particular policy decision is made, such as choosing to host an IGC, can its implications be indicated by relative change in the levels of co-authorship. In this respect co-authorship may provide a reasonable measure to address whether hosting an IGC has a measurable impact on international collaboration in the geosciences for the host nation.

A major challenge in trying to measure an impact in international collaboration is establishing an appropriate baseline. For this purpose the production of geoscientific publications, as available under the GeoRef or GEOBASE databases (American Geosciences Institute, 2012; Elsevier, 2012), were examined for each of the previous IGC host nations back through to the 1976 Australian IGC, which was the last IGC for which sufficient records exist within the databases. For each conference international collaboration was compared for the three-year period prior to the conference and the three-year period after the conference ([Table 2.2](#)).

The results of [Table 2.2](#) are highly varied between IGCs which is probably because many other factors are also affecting international author contributions e.g. broad scale political, economic and social factors. The three-year baseline period was chosen because it produced a sufficiently large number of publications to allow meaningful statistical calculations, while being shorter than the period between successive IGCs. However, the choice of this baseline period may not be ideal to highlight influences of an IGC, if those influences do not match the baseline period sufficiently well. Using this metric the results suggest that hosting an IGC does not provide a consistently measurable benefit of increased international collaboration for the host country.

Table 2.2: Change in international author contributions* to publications** originating from an IGC host nation, as a fraction of total geoscience publications as referenced under the GeoRef and GEOBASE publication databases (accessed 8 June, 2012) (American Geosciences Institute, 2012; Elsevier, 2012).

Year	Host	3 yr period pre-IGC	3 yr period post-IGC (inclusive)	Delta (%)
2008	Norway	1.18	1.01	-14.47
2004	Italy	0.71	0.79	12.36
2000	Brazil	0.53	0.52	-3.26
1996	China	0.18	0.14	-25.20
1992	Japan	0.91	0.95	3.69
1989	USA	0.19	0.26	36.76
1984	USSR	0.28	0.08	-72.31
1980	France	0.48	0.27	-43.50
1976	Australia	1.25	0.10	-92.12

* The top 59 countries were included in the count. ** Publications defined by journal articles available in GeoRef and GEOBASE databases.

To further test this hypothesis and decrease the dependence on the baseline period, an alternate approach was taken for the four most recent IGCs; in Norway, Italy, Brazil and China. Using Scopus (2012) database dating back to 1996, data was collected for international collaboration at a country-specific scale, for both all academic disciplines and for earth sciences specifically. International collaboration in the earth sciences, for a specific country in a specific year, was normalised by the average international collaboration across all disciplines. This provided a temporal record of relative changes in the amount of international collaboration in the earth sciences that were unrelated to country-wide trends (Figure 2.2).

The results, summarised in Figure 2.2, show that there was no measureable impact in international collaboration for the European nations of Norway or Italy, in or around the years they hosted an IGC (2008 and 2004 respectively). China and Brazil, on the other hand, exhibit increases in publication around the years they hosted an IGC (1996 and 2000 respectively), though these anomalies were short-lived and quickly returned to the long-term average trend. This suggests that an IGC provides no measureable impact in international collaboration for western countries, where the ease and openness of communication may already be established. In developing countries, however, hosting an IGC may have a more significant impact (albeit short-lived) in exposing the scientists from that nation to others from around the world. Based on this trend it can be supposed that geosciences in Australia will not experience much change in international collaboration as a result of the 34th IGC. However, it is worth stressing that attempting to attribute cause and affect relationships purely based on temporal coincidence is not a rigorous technique and is susceptible to interference from confounding variables. Thus these inferences should be treated with caution.

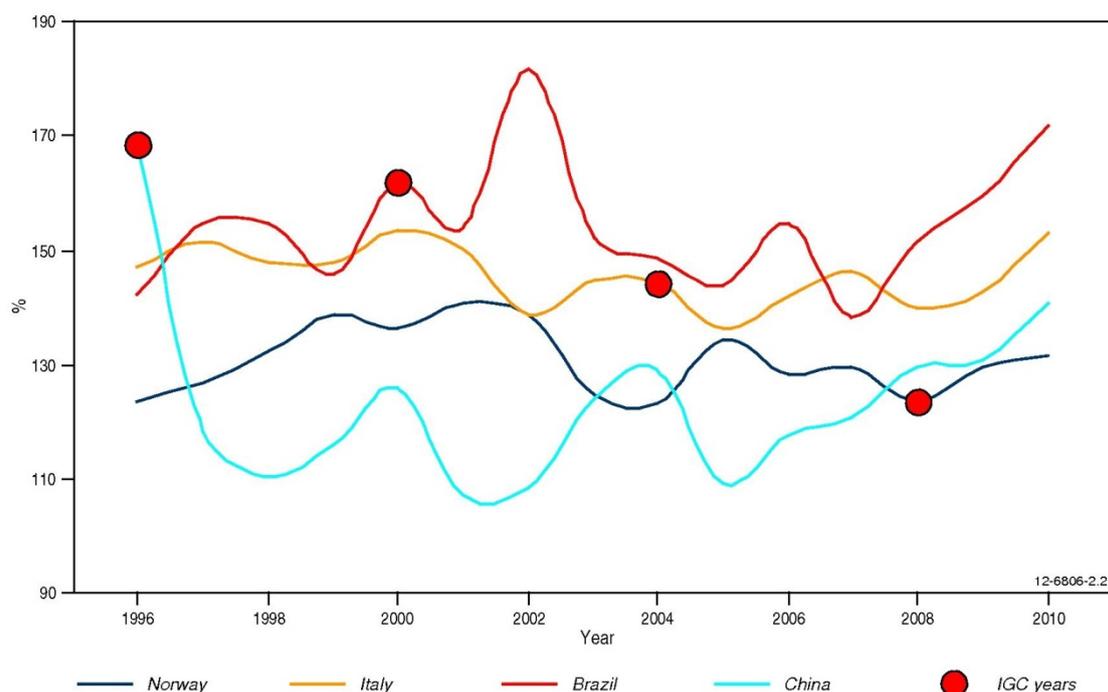


Figure 2.2: International collaboration in geoscience publications relative to all disciplines for the last four IGC host nations, from 1996 to 2010, as per data from Scopus (2012). Red circles denote IGC years for the respective host countries.

It is important to note that even if the overall rate of international collaboration remains constant, the composition of those collaborations may not. For example, the recent *Health of Australian Science* report (Office of the Chief Scientist, 2012) identified a regional shift in Australia's international collaborations from traditional partners, in North America and Europe, towards collaborations with partners in Asia. It is likely that the 34th IGC would both reflect this growing trend and help to foster it. Such a theory is supported by the large contingencies of delegates from countries such as China and India. The interactions that were encouraged by the 34th IGC may not have a measurable impact on the academic output of Australia, but rather may reflect this more subtle strategic repositioning of Australia's research community. This hypothesis could not be tested in the current study, but may be more appropriately considered retrospectively into the future.

2.4. Research Publications

The IGC represents a major gathering of experts in the geoscience community. As such, one would expect an IGC to provide a focal point for scientific research and stimulate the minds of attendees with exciting and previously unconsidered possibilities. This leads to the hypothesis that an IGC will cause an increase in scientific productivity for the host country. Even though an IGC attracts delegates from all parts of the globe it is reasonable to expect that the benefit of increased scientific production would be strongest within an IGC host country. This is because the host country always supplies a large number of delegates and the logistical effort surrounding the organisation and preparation of sessions, fieldtrips and workshops provides a certain momentum to the local geoscience community.

2.4.1. Case Study: IGC Host Nation Publication Rate

Scientific productivity has many facets and is difficult to quantify. Therefore, scientific journal publications were used as a simple measure to test the hypothesis that hosting an IGC would lead to increased scientific productivity within the host nation. Anecdotally, Professor Abbate did not observe any change in the number of geoscience publications being produced as a result of the 32nd IGC. Dr Solheim observed an increase in geoscience paper output in the years surrounding the 33rd IGC within Norway. However, Dr Solheim credited the nation-wide increase in research production to concerted efforts in preparation for a national evaluation of all Norwegian geoscience institutes conducted in 2011, rather than hosting the 33rd IGC. This process may have caused Norwegian universities and research institutions to increase their research publication efforts in order to improve their standing prior to this evaluation, rather than being directly related to the 33rd IGC. It provides another example of why the statistics gathered should be treated with caution, as it is difficult to account for externalities or broader context which can affect the statistics.

Using scientific journal publication statistics, the research production in the geoscience field was assessed quantitatively for the last six host countries of the IGC (Figure 2.3). The statistics were based on records present in the major geoscientific databases GeoRef and GEOBASE (American Geosciences Institute, 2012; Elsevier, 2012) that matched the general keyword 'earth' (either in the title or abstract of the article). Searching the databases required at least one keyword and 'earth' was broad enough to produce large volumes of results spanning a range of geoscience topics. The articles were categorised by the country of publication, which means that the efforts of local authors publishing in international journals was not captured. The articles associated with an IGC host nation were compared to the total number of articles published worldwide for yearly periods. This approach allowed a quantitative assessment of the relative combined standing of scientists and publishers based in IGC host nations e.g. hosting an IGC may attract more international scientists to publish in journals based in that country.

Although the data was inherently noisy, a consistent peak in publication rate was observed during IGC years for each of the host countries with the exception of the USA (Figure 2.3). However, the periods of increased publications were brief, with host countries reverting to publication rates consistent with their respective long-term trends. Based on these results there does appear to be a measurable impact on the rate of research publication that could be attributed to hosting an IGC. However, the short duration of the publication spike suggests the momentum of scientific productivity derived from hosting an IGC is relatively short lived.

Most of the host countries show a long-term increasing trend indicating rising prominence in the geoscience research domain, with the exception of the USA, whose research strength appears well established and ingrained. This is not unexpected, as countries making concerted efforts to advance their geosciences would be more likely to prevail in the competitive IGC host nation selection process. This is consistent with the observed trend of long-term increasing contributions to world geoscience literature by IGC host nations.

The impact of the 34th IGC on publication rates within Australia could not be investigated within time frame of this study. However, some insight may be provided by considering the major factors influencing research publications in Australia: 1) the Excellence in Research Australia program which ranks university departments based on the number and quality of publications by its researchers and 2) issues regarding the release of industry research as publications due to Intellectual Property restrictions (Webb, 2012). In effect, research grants are the main drivers for geoscience publications

within Australia, and it is unlikely that the 34th IGC will be a major factor affecting geoscience publication numbers beyond 2012.

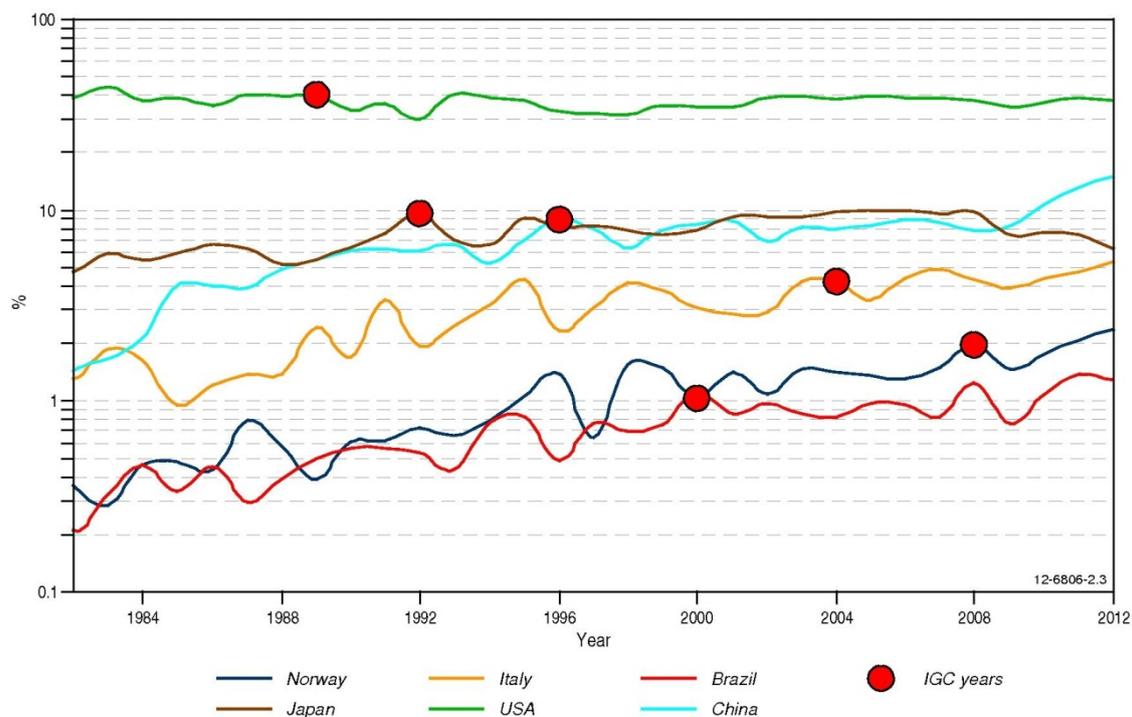


Figure 2.3: The number of journal articles (excluding conference papers) containing the general keyword ‘earth’ in the title or abstract, shown for IGC host countries as a percentage of the worldwide total number of journal articles meeting those criteria. IGC years for each country are highlighted by a red circle. These results are based on data from the combined GeoRef & GEOBASE databases (American Geosciences Institute, 2012; Elsevier, 2012).

2.5. Impact on Student Dynamics

An investigation on the effect of hosting an IGC on university dynamics was conducted. Both Professor Abbate and Dr Solheim indicated that the IGC was not a factor affecting geoscience student enrolments, nor the commencement of post-graduate studies. Professor Abbate did not observe a change in student numbers at his university. However, Prof. Abbate did see a shift in the desired research focus of students following the 32nd IGC, which was well attended by graduate students, from fundamental basic geology to areas of applied geology and geological engineering. He also observed that primary motivators for student attendance at the 32nd IGC were for personal development and the opportunity to access books and papers via the publishing companies present at GeoExpo 2004.

The 33rd IGC promoted student participation in two ways:

- Allowing 100 students from Nordic universities to help organise and participate in the 33rd IGC as staff; and,
- Sponsoring NordForsk which allowed 30 PhD students from within the Nordic countries to attend (IUGS, 2008).

However, Dr Solheim indicated that there hadn't been a noticeable change in local geoscience student enrolments in the subsequent years, as enrolments are predominantly controlled by the job market in Norway. On this note, Dr Solheim identified that several students attending the 33rd IGC were directly recruited by companies that were present.

The 34th IGC is likely to follow a similar trend as the 32nd and 33rd IGCs and should not have a major influence on geoscience student numbers. Research has found that tertiary geoscience student levels in Australia are strongly linked with the rises and falls of industry demand and associated commodity prices and the number of geoscience departments present in Australian universities, which is strongly funding limited by university business models (Webb, 2012). None of these factors are likely to have been significantly influenced by the 34th IGC.

2.6. Tourism

The most overt, national-scale impact of hosting an IGC is the large capital injection into the local economy. Meals, accommodation and registration are some of the significant expenses encountered on a daily basis by each delegate at the congress. Furthermore, IGC field trips distribute delegates across the region. Provision of these services is not only beneficial for the companies directly involved, but flows on to stimulate the community at large. Professor Abbate and Dr Solheim confirmed that both Florence and Oslo did experience a boost in tourism related to the IGC. However, tourism is not always considered when choosing the host cities for an IGC. For example, Professor Abbate pointed out that tourism was a deciding factor in Florence being selected as the host city, but was not considered when the initial bid proposal to host the 32nd IGC was developed. The tourism appeal of Florence was critical and the major deciding factor against a competing bid by Austria to host the 32nd IGC in Vienna. By contrast, Dr Solheim indicated that tourism was not considered at all by his nations' bid to host an IGC.

2.6.1. Case Study: Canada Justification to Host 2020 IGC

The potential economic benefits of hosting an IGC are illustrated by the Canadian bid to host the 36th IGC in Vancouver. The major justification for the bid was built on commercial decisions. The 36th IGC 2020 Feasibility Committee concluded that hosting the IGC would be "financially viable and even profitable" and that; "With the full support of the entire earth science community in Canada, this congress has the potential to generate millions of dollars for the participating learned societies and local economy" CFES (2010).

The Canadian National Research Council's Conference Services Office (NRC-CSO) fully endorsed the bid for the 2020 IGC because its modelling had indicated that Canada stood to gain a 'significant economic boost'. With 30 years experience, the NRC-CSO estimated that such international conferences generate a \$400/person/day (CAD) return for the local economy. With potential to attract some 10,000 delegates, the Canadian 36th IGC bid envisaged a possible return of some \$40 million dollars (CAD) (CFES, 2010).

2.6.2. Case Study: Tourism in Norway Around the 33rd IGC

The Norwegian boost in tourism resulting from hosting the 33rd IGC is highlighted by The World Economic Forum assessments of Travel Tourism and Competitiveness performance ([Table 2.3](#)).

These assessments ranked Norway anomalously high for 2008, the year of the 33rd IGC. Clearly, there are factors other than hosting an IGC which might have affected these rankings, the global financial crisis being an obvious example. However, it is interesting to note that the major anomaly that led to such a high overall ranking in 2008 was the “human cultural and natural resources” index. This index “captures the human and cultural elements of each country’s resource endowments” (Blanke & Chiesa, 2008), and of the different indices seems the most likely to be impacted by hosting the 33rd IGC. In fact, a contributor to the index value is “international fairs and exhibitions” which would certainly have been affected by Norway hosting the 33rd IGC.

Table 2.3: *Compilation of World Economic Forum assessments of the Travel Tourism and Competitiveness performance of Norway. The data was sourced from Blanke & Chiesa (2007, 2008, 2009 & 2011). The 33rd IGC was held in 2008.*

year	Overall		Regulatory framework		Business environment and infrastructure		Human cultural and natural resources	
	rank	index value	rank	index value	rank	index value	rank	index value
2007	23	5.04	9	5.45	21	4.56	40	5.12
2008	17	5.05	8	5.66	19	4.9	20	4.6
2009	19	4.97	9	5.64	19	4.84	36	4.42
2011	20	2.98	8	5.71	26	4.79	32	4.45

2.6.3. Case Study: Tourism for Australia around the 34th IGC

The major consequence of increased tourism is an increased cash-flow into the region. Carillion Conference Management (CCM) estimated a daily expenditure of approximately \$600/person/day (AUD) for the conference, resulting in an injection of more than \$18 million dollars (AUD) into Brisbane (Rowland, 2012a). However, this figure doesn’t include the economic return from the 450 delegates attending 36 conference field trips (Marx, 2012b). Nor does the figure include any potential long-term tourism expenditure due to increased exposure to locations such as Brisbane, the Great Barrier Reef, the Whitsundays, and the Glass House Mountains. GA’s delegates indicated many international visitors were impressed with Brisbane and Queensland’s clean air, nice people and a positive atmosphere. As a result, there is a strong likelihood that the actual economic return of hosting the 34th IGC in Australia is significantly higher than the \$18 million dollars (AUD) quoted. However, the impacts of this boost in tourism and expenditure are likely to be restricted to the Brisbane region, and may not represent a homogeneous, nationwide benefit for Australia.

2.7. Public Awareness of Geoscience

It is reasonable to assume that hosting a scientific event of the magnitude of the IGC will lead to greater public awareness of the major themes being addressed at the conference. However, the evidence suggests that this is not the case. Professor Abbate explained that although the 32nd IGC had significant media coverage, the Italian public were far more concerned with coverage and information on earthquakes, which are an ever-present hazard in Italy, than the key issues discussed at the conference.

On the other hand, Dr Solheim revealed that the geosciences in Norway are held in far greater esteem by the public than in Italy or Australia. This is purportedly because the public recognise and acknowledge the successful and beneficial exploitation of Norway's resources, and the work geologists do to mitigate and provide advice for natural hazard problems. This positive public perception of the geosciences in Norway, coupled with the extensive media coverage for the 33rd IGC (which arose out of necessity due to sponsorship agreements) meant that key issues were covered more fully and passed on to the public through a range of media including radio, TV, newspaper and the internet (IUGS, 2008). Therefore, it appears that the transfer of geoscience information to the public through hosting an IGC may be highly variable. The relatively successful example of the 33rd IGC merits further investigation.

2.7.1. 33rd IGC Public Outreach Investigation

The effectiveness of engaging the public on geoscience issues during the 33rd IGC was analysed using Google Insights data. The data tracks the relative number of Google searches for a term temporally and geographically and was used to gauge broad scale trends around public interest in geoscience topics. It was hypothesised that hosting an IGC would stimulate increased, wide-scale interest in geoscience topics, which would be reflected in increased Google search rates for relevant keywords coincident with an IGC.

It is important to recognise that Google Insights provides a relative search volume index which is normalised to correct for the increased usage of the internet and Google searches over time. Put simply, the data tracks the number of searches for a particular term, relative to the total number of Google searches over time. In this example, the results have been filtered by location so the data represents the relative interest in Norway. In some cases it was necessary to use search terms in Norwegian to record sufficient traffic to construct the plots. This indicates that the demographic that the data probes includes a significant population of Norwegian locals.

Figure 2.4 gives the results of these searches and shows some evidence that hosting the 33rd IGC led to an increased broad scale engagement with earth science topics. The use of the search term 'geologi' was approximately constant over the entire period of interest and provides a baseline for comparison with search terms specifically related to 33rd IGC symposia. Interest in 'geoscience' peaked sharply in the month of the conference (August), though the interest was not sustained beyond this period. Norwegian interest in groundwater and permafrost follow similar trajectories, increasing in the months preceding the 33rd IGC and remaining strong (with a slight tail off) to the present. This trend is likely because sub-permafrost groundwater is a topic of interest in Norway.

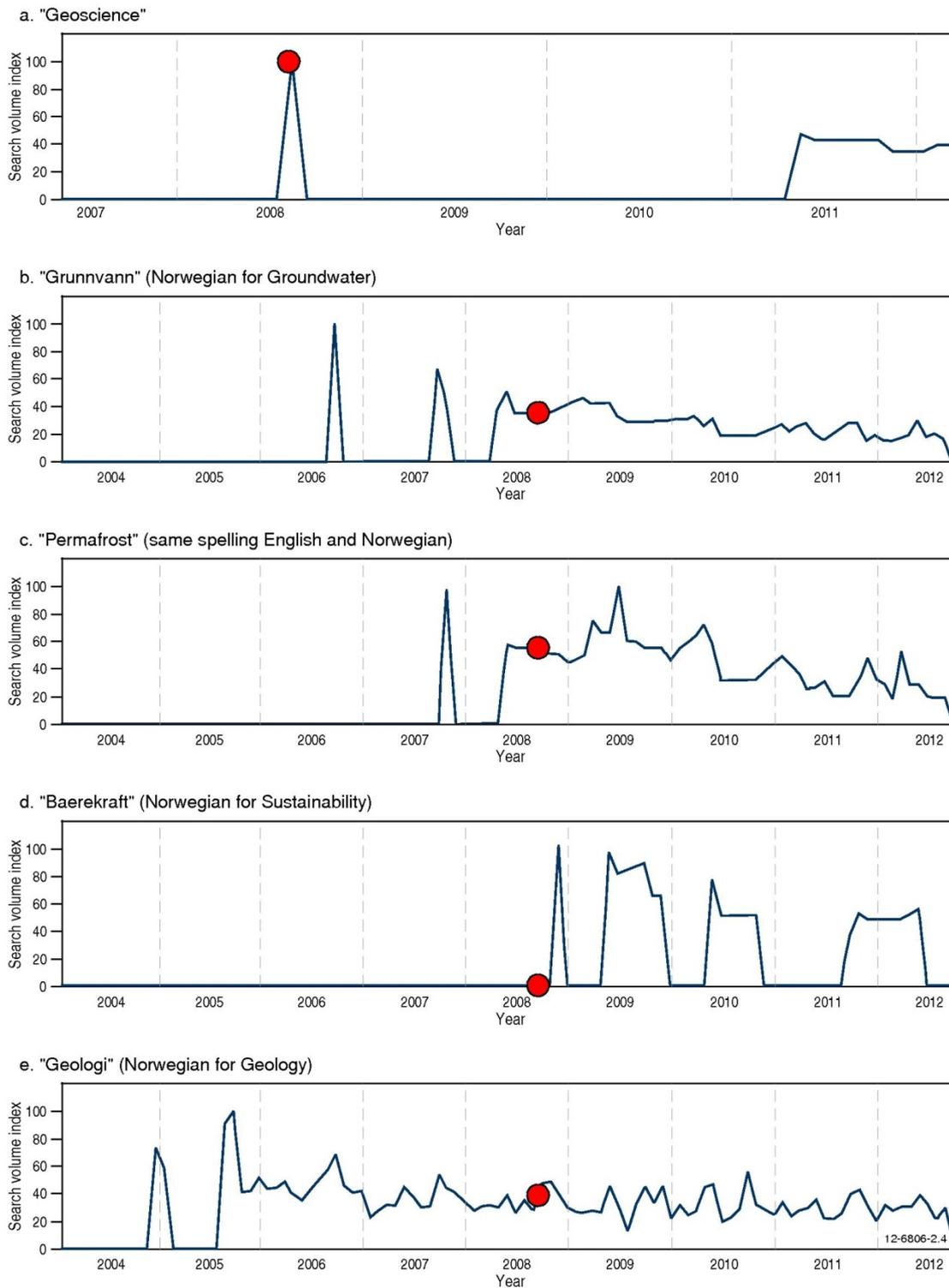


Figure 2.4: Google Insights data for search queries originating in Norway on topics related to Symposia of the 33rd IGC held in Oslo in August 2008. The plots are annotated with the corresponding search terms. Note the change in horizontal scales.

Figure 2.4d also shows that there was very strong interest in sustainability ('bærekraft') around the month of the 33rd IGC, which then dropped off, before picking up again in 2009. This second peak in sustainability may have been related to the United Nations Framework Convention on Climate Change (UNFCCC) held in Copenhagen in December 2009. If this was the cause, then the 33rd IGC appeared to produce an increase in public engagement of similar magnitude to the UNFCCC, though the interest generated from that conference was more sustained and was indicative of a greater total influence.

When these same Google Insights search terms were repeated on a global scale to get an idea of international public exposure to issues presented at the 33rd IGC, only a static baseline was observed. This is a limitation of Google Insights, because the relative number of times these terms were searched globally is very small relative to the total number of Google searches for that period.

2.7.2. Public Awareness for Australia

"Iain Stewart believes that the secret to sparking public interest in geology is to tell compelling stories with a human element that will captivate an audience."

The Courier-Mail, Anthony Marx (4 August, 2012)

The 34th IGC attracted extensive media coverage, both domestically and internationally. This was a boon for the advertisement of the conference itself; however the media failed to engage in the type of dialogue encouraged by Iain Stewart (Marx, 2012a) and was therefore limited in its ability to increase the broader public interest in geology and the geosciences.

Analysis of the nature and structure of media articles, particularly those in the main-stream media, highlight that the key narratives revolved around; the prestige of hosting the event, the 34th IGC as a prelude to hosting the G20 summit, the financial boost to the local economy, and the resource needs of China. In this respect, most people's exposure to the 34th IGC revolved around the economics and image of the congress rather than the science being discussed.

If Iain Stewart's comments are correct, then the nature of the 34th IGC media coverage will mean that there has been only a very limit impact on public interest in the geosciences in Australia. This is reflected in data from Google Insights when localised to reflect Australian society. The long-term trends, from 2004 to present, for terms such as 'geoscience' show no measureable increase in public interest as a result of Australia hosting the 34th IGC (Figure 2.5). While initial analysis of Figure 2.5a shows a significant spike in interest around the 34th IGC (point #1), closer inspection reveals that this is actually coincident with the 19 June 2012 Gippsland earthquake (Geoscience Australia, 2012). This is further supported by analysis of peak-interest points #2 and #3, which are coincident with the 6 March 2009 Melbourne earthquake (Geoscience Australia, 2009) and the 2 April 2007 Solomon Islands tsunami (Geoscience Australia, 2011). These compelling events, with direct human impacts, are much more effective at generating public interest.

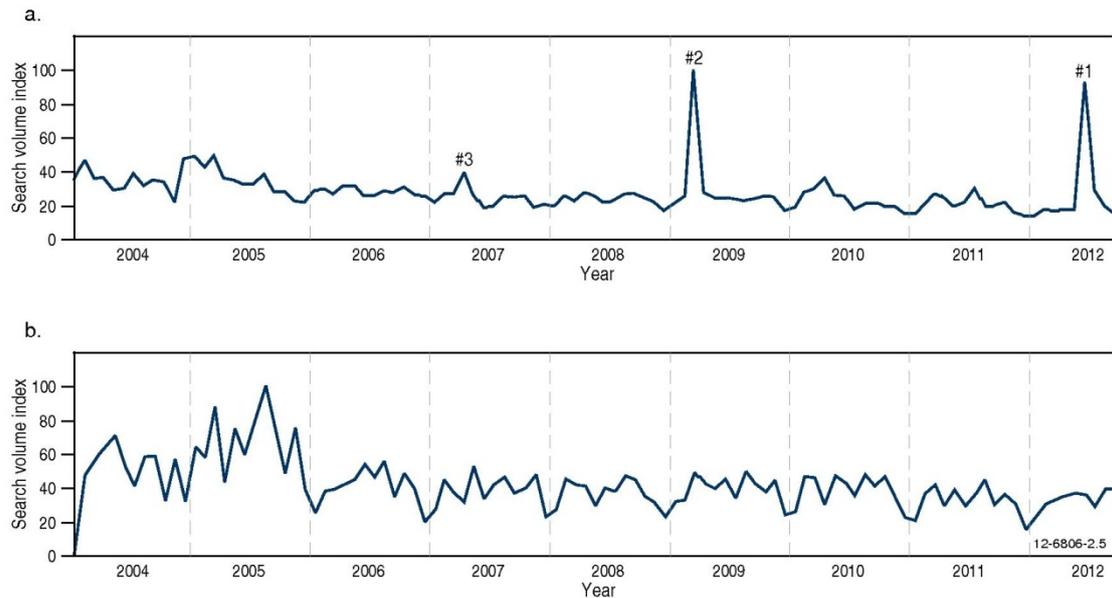


Figure 2.5: Google Insights data for search queries originating in Australia, showing the relative interest in search terms through time. a) Shows searches related to 'geoscience'. The points #1, #2 and #3 highlight peak-interest periods corresponding to local seismic activity. b) Shows searches related to 'earth science'.

2.8. Sponsorship and GeoExpo Exhibitor Demographics

GeoExpo utilises a trade-show style with exhibitor booths; it has formed a central hub of the past three Congresses. Figure 2.6 shows and analysis of both the number and categories of exhibitors over the past three IGCs. Firstly, it is notable that there is a marked increase in popularity of the GeoExpo for the 34th IGC, with booth entries increasing from ~90 for the 32nd and 33rd IGCs to 140 for the 34th IGC. Considering this was the largest GeoExpo in IGC history, it was apparent that many organisations considered their presence at the 34th IGC important and valuable. Categorising the booths under the fields of industry, research and government highlights the shift in stakeholder priorities and economic climate between the last three IGCs. The 32nd IGC was principally sponsored by Italian Government institutions within the European Union (IUGS, 2004) and is reflected by the large proportion of government booths (50%). For the 33rd IGC, over 50% of sponsor contributions came from industry as well as significant support from Norwegian Government and Norwegian research bodies (IUGS, 2008). This was demonstrated in the even split between the research, government and industry booths at the 2008 GeoExpo. The 34th IGC was primarily sponsored by industry which was exemplified by the proportion of industry booths in the GeoExpo (52%). The high industry presence largely reflected the economic situation in Australia, particularly the 'mining boom' of the time. Anecdotally, a boost in industry support for the 34th IGC has been attributed to a large advertisement that was placed in the luggage collection area at Perth airport, Western Australia, which is used frequently by fly-in-fly-out workers. After the advertisement was placed there was a large spike in exhibitor applications for the GeoExpo.

A survey was conducted on 10 booths at the 34th IGC to investigate; the exhibitor's motivations for supporting and attending the 34th IGC, and what impacts they envisaged for their organisation as a result of their involvement. The responses followed a recurring theme, though it should be noted that the staff manning the booths often had limited ability to comment on the true motivations of the organisation which may not have been accurately reflected by the survey.

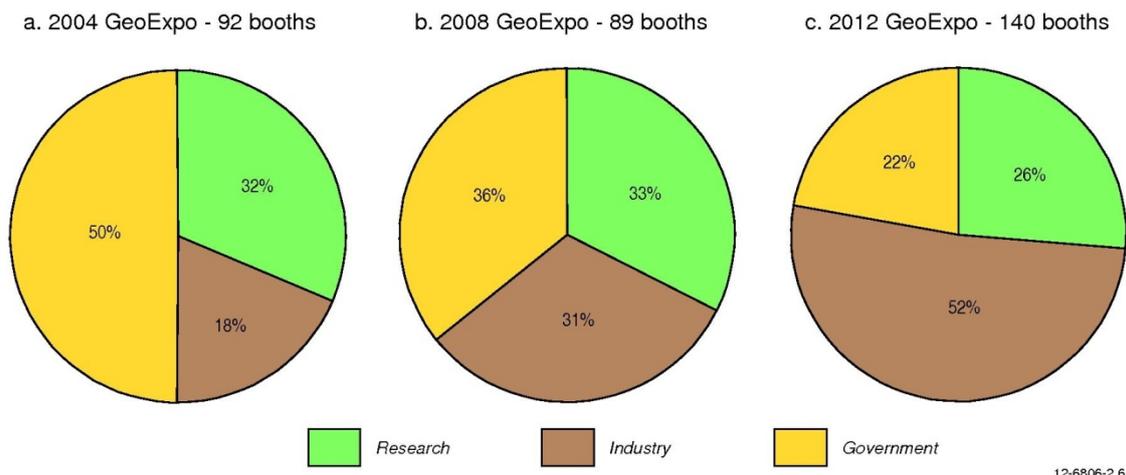


Figure 2.6: The break-down of booths at the GeoExpos for the a) 32nd, b) 33rd and c) 34th IGCs.

The primary motivation for exhibitors (common across industry, government and research) was that they saw the IGC as the premiere international geoscience event. Consequently, the 34th IGC was used as a forum to promote brands and products, promote technological and research excellence, and to advertise in general. Another common response was that the exhibitors were interested in engaging with potential young employees at the conference. Several exhibitors expressed minor objectives of networking, making new contacts and meeting with clients to broker deals. In general, the larger industry booths, who also generally were major sponsors of the 34th IGC, saw the conference as an opportunity to recruit fresh young minds for graduate programs or experienced professionals for consultant roles.

2.9. Conclusions

The focus of this chapter was to investigate national scale impacts that occur as a result of hosting an IGC, allowing direct or indirect inference of the expected impacts in Australia following the 34th IGC held in Brisbane from 5 to 10 August 2012. A clear benefit related to hosting the 34th IGC was increased tourism revenue, which appeared to be consistent across the last three IGCs. In other areas, including student dynamics and public awareness, beneficial impacts were identified in specific cases but were not consistent between IGCs. However, consideration of broad-scale political, economic and social factors may help to explain the disparity in impacts observed by different IGCs and support the hypothesis that impacts in Australia that have yet to be realised.

The positive impact of increased academic production by IGC host nations was visible at the national scale and consistent between IGCs, but relatively short-lived. In addition, despite evidence that networking and collaboration opportunities are important to delegates at the personal scale, no change to international collaboration was visible at the national scale. These observations hint that while some of the national scale impacts of hosting an IGC may only be visible for a short time, they may persist at the personal scale where they might still be crucially important. The 34th IGC also was an effective forum for individual organisations or projects to promote their work to the wider geoscience community based on the case study of the ASTER Geoscience Map of Australia product launch and the GeoExpo exhibitor feedback.

Hosting an IGC allows the host country to showcase the geology of its region to an international audience and to focus the conference themes on the issues that they consider most important. This process allows each IGC to be unique and may result in differing outcomes for each IGC.

2.10. Recommendations

With respect to the above, the following recommendations are made.

1) Tourism benefits should be noted

Tourism impacts should be considered during an IGC bidding, proposal and organising stages since it showed a consistent positive impact for IGC host nations.

2) Media is important for public awareness of the geosciences

Conferences such as the IGC could better influence public interest in the geosciences by focusing on how to control the media narrative around the event. Main-stream media tend to report on the socio-economic impacts of such events, but this type of dialogue fails to capture public interest in the underlying sciences.

3) Further assessment of national impacts

A more rigorous assessment could be performed if initiated earlier in the lifecycle of the conference. For example, a socioeconomic impact assessment, which generally requires extensive surveying of delegates, can take into account both economic and non-economic factors which play a part in the conference's success and effectiveness (Severt et al., 2007).

4) Need to consider scales of impact

National-scale metrics, by themselves, are insufficient to assess the total impact of hosting an IGC, as factors which contribute to personal development may be very important at the micro-scale but may not up-scale to the national level.

3. Impacts for Geoscience Australia

3.1. Introduction

The impacts of the 34th IGC were analysed at both the organisational level and personal level through investigating GA's role in promoting, organising and running the 34th IGC in Brisbane. Geoscience Australia's mission is to meet the geoscience needs of the nation and to use geoscientific information and knowledge for the economic, social and environmental benefit of Australia. As the leading provider of geological and geoscientific information for Australia, GA has undertaken an active role in the organisation and promotion of the 34th IGC. As a government agency it is important for GA to assess and understand not only the true cost of the congress to the organisation, but also the benefits. Assessing the impact of GA's involvement in the 34th IGC is a broad question. The focus of this chapter is to gauge the investment involved in GA taking such an active role in the 34th IGC, by discussing the impacts of the 34th IGC for GA employees and the organisation as a whole (Table 3.1). The impacts were assessed in relation to GA's vision outlined in the 2011-2014 Strategic Plan (Commonwealth of Australia, 2011) as follows:

- Does participation in the 34th IGC build GA's capacity as the primary provider of technical geoscientific advice to the Australian Government?; and,
- Does GA's involvement in the 34th IGC galvanise access to precompetitive data and requests for legacy data?

The Australian Government is committed to the use of cost-benefit analysis, as it encourages better decision-making and provides accountability for public expenditure. Indeed, the Australian Public Service (APS) Code of Conduct states that all employees must use government resources in a proper manner. The Department of Finance review of GA in 2011 specifically addressed the need for a strategic review to examine GA activities and to assess the contribution and benefits of its outcomes (Commonwealth of Australia, DFD, 2011). However, while many of the costs associated with GA's involvement in the 34th IGC are measurable, a large number of the benefits of this involvement are difficult to measure. For example, GA employees that attended the 34th IGC had a number of opportunities to engage with their scientific peers. Professional development and networking amongst peers promotes an increase in job satisfaction, a better working environment, and potentially increased retainment of employees and knowledge within the organisation. Despite the difficulty of assessing these intangible benefits, they are critically important in forming an overall evaluation of the impacts.

3.2. Literature Review and Key Discussions

In order to determine whether GA had pre-existing processes for evaluating conferences, an initial examination of documentation available within GA was completed and several meetings were held with individuals, mainly within Human Resources. Throughout the study difficulties ascertaining procedures for several activities were found, these included:

- Analysis of Learning & Development (L&D) documentation;

- Dissemination of conference related content;
- Dissemination of information related to conference related visitors;
- Documentation of the initial project proposal, including the identification of key performance indicators;
- A formal recording of domestic and international conferences;
- A formal process for analysis of external L&D activities; and,
- Guidelines or a formal process for administering a survey within GA.

However, it should be noted that some of these points are currently under review.

Table 3.1: Key questions to be addressed in this chapter and the methods and activities undertaken to address the questions.

Question	Assessment	Activities	Details
Does participation in the 34 th IGC build GA's capacity as the primary provider of technical geoscientific advice to the Australian Government?	Individual employee's uptake of knowledge	Survey Questions	Include questions on which activities at the 34 th IGC participants were involved in (workshop, presentation, talks, etc.).
		Examination of Procedures	Establish and evaluate what avenues exist within GA to disseminate information post-conference. Evaluate the current practice and documentation within GA.
		Interviews with HR	Establish how Human Resources (HR) assess the L&D value of conferences such as the 34 th IGC.
	Retention of knowledge within GA	Survey Questions	Examine whether participation in the 34 th IGC increased job satisfaction.
	Network/relationship building and maintenance	Survey Questions	Examine whether participants were involved in activities that built or maintained networks. Ask how stakeholders perceive the credibility of GA.
Does GA involvement in the 34 th IGC galvanise access and requests for precompetitive, products and legacy data?	Case Study e.g. ASTER Geoscience Map of Australia release	Survey Questions	Ask GA delegates whether they were involved with a project delivered at the 34 th IGC.
		Download Statistics	Measure the activity on websites for the relevant dataset.

3.3. Interviews

Anecdotal evidence of positive outcomes from the previous IGC held in Australia (25th IGC, Sydney 1976) prompted the identification of individuals within the GA suitable for case study interviews. Interviews were targeted at current GA employees that were either within Bureau of Mineral Resources (BMR, a predecessor to GA) at the time of the 25th IGC, or had attended the 25th IGC prior

to commencing employment at GA. In total, four GA staff members were interviewed about their experience of the 25th IGC:

- Dr Clinton Foster (PhD student in 1976);
- Dr Alistair Stewart (BMR employee for 15 years in 1976);
- Dr Marita Bradshaw (Honours student in 1976); and,
- Dr John Kennard (BMR employee for 1 year in 1976).

These GA employees were asked:

- Did your attendance at the 25th IGC impact your time at GA?;
- Did your attendance at the 25th IGC influence your career?;
- To describe their experience at the 25th IGC;
- What stage of their career they were at during the 25th IGC?; and,
- Were there any major products to come out of or developed for the 25th IGC?

These questions were deliberately broad to allow a range of responses and to encourage the interviewees to reflect on any long-term benefits of participation in the 25th IGC to their professional development.

The main themes to emerge from these discussions were that the 25th IGC provided participants with exposure to a great breadth of international geoscience research and an opportunity to show off Australia and its fantastic geology. The breadth of the science and international nature of the congress left an impression on those who had just completed their studies. At the time of the 25th IGC, it was much rarer for geoscientists working at BMR and geology students to get the chance to attend an international conference and therefore, for them to be aware of current international research trends. This was important as information was not as readily available in 1976. It was also noted that BMR had the major role in designing and organising many of the IGC field trips e.g. Amadeus Basin (Wells, 1976).

3.4. GA 34th IGC Participation Survey

Surveys are a useful tool for collecting data in a non-threatening environment (Voice Project, 2012a). They provide a snapshot of participant's attitudes and perceptions, and are also an important mechanism for allowing staff to feel engaged, by providing a pathway for feedback. Therefore, a survey on experiences surrounding the 34th IGC was administered to 120 GA staff who attended the congress, capturing a cross-section of GA employees across all APS levels and with varying levels of experience.

The survey was delivered in two parts; one pre-congress and one post-congress ([Appendix One](#) and [Appendix Two](#)). This enabled the capture of the mood and attitude of the organisation immediately pre- and post-34th IGC, as well as differences between expectations and the realities of conference attendance. The two-part survey had the additional benefit of providing an opportunity to identify key issues prior to the 34th IGC and use these to guide the questions in the post-34th IGC survey. The survey was also designed to assess whether short-term expectations were met. Medium to long-term benefits were identified but could not be assessed within the time frame of the project and require follow-up assessment by the organisation.

3.4.1. Survey Format

In order to maximise the response rate, several criteria guided the design of the survey. These included:

- The total survey should be short and take less than ten minutes to complete;
- Clear questions that avoided ambiguity;
- Clear layout and design; and,
- A mix of multiple choice and free-text questions.

The use of different types of questions was considered important to appeal to different types of respondents. Those that want short and sharp questions and those that want to verbalise exactly what they wish to get across. In addition, the first survey used more questions with free-text responses, allowing broad information gathering that was used to focus the second survey, which contained more multiple-choice questions to expedite the survey analysis. The mix of multiple choice and free-text response questions were carefully designed and reviewed.

The survey was hosted on the Survey Monkey website (SurveyMonkey, 1999-2012). GA delegates were sent an email containing a link to the online survey, a short explanation of the purpose and an invitation to participate. Results were then downloaded from Survey Monkey as a spreadsheet that could be loaded in to Microsoft Excel. GA employee u-numbers were used to match up responses between surveys and then were replaced by a set of randomly generated numbers prior to analysis of the results. This step was taken to preserve the anonymity of the respondents.

3.4.2. Analysis of Respondents

The survey questions fell into one of three question types: analytical results, short answer and free-text response. A total of 59 (49%) of the 120 GA delegates responded to the pre-34th IGC survey, while 65 (54%) responded to the post-34th IGC survey. Forty four people (37%) responded to both surveys. These responses were assumed to be representative of the entire GA delegate population with a level of uncertainty defined by the stated confidence intervals. The reported finding for a particular survey question was associated with a confidence interval calculated based on the sample size, population and percentage of answers to give a confidence level of 95%. For example, there is at least a 95% chance that the reported findings, interpreted with respect to their confidence intervals, would remain consistent had 100% of GA IGC delegates responded to the surveys. Where not otherwise stated, a worst-case confidence interval of $\pm 12\%$ should be inferred to provide 95% confidence that the survey responses reflect robust trends within the GA delegate population.

The responses were distributed across all APS levels (Figure 3.1) indicating the data was representative of all APS levels. However, as the number of staff who participated at the 34th IGC at specific APS levels was unknown, the percentage of staff that responded at each level could not be provided.

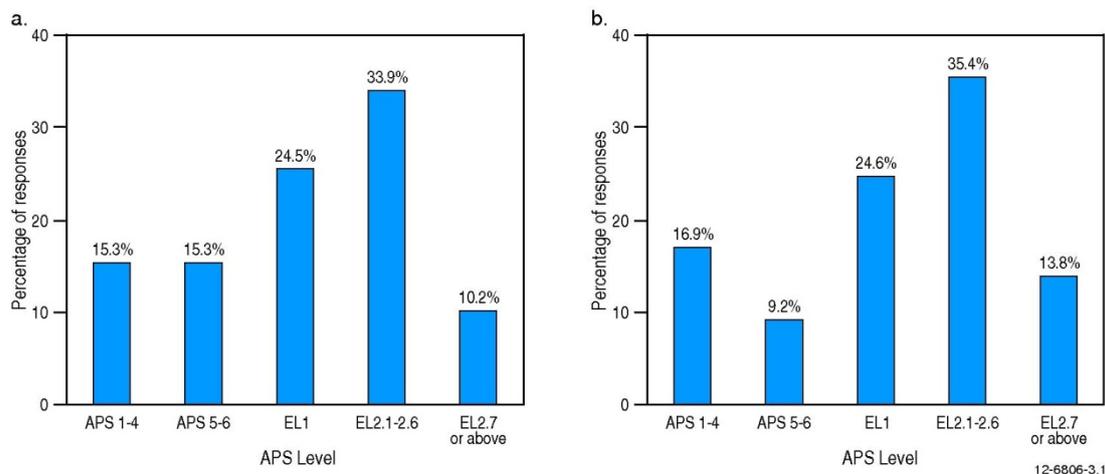


Figure 3.1: Distribution of response percentage across all APS levels at GA for, a) the Pre-34th IGC survey and, b) the Post-34th IGC survey.

3.5. Agency Wide Impact for Geoscience Australia

There are a number of ways the GA benefited from being involved in the organisation of the 34th IGC. Firstly, GA contributed significantly to the organisation of the scientific program ([Appendix Three](#)). Therefore, GA had the opportunity to influence the content, so that the scientific research on display was best able to meet GA's need to keep up to date with applicable science for Australia's most important geoscience challenges. Secondly, building and strengthening partnerships through networking is an important aspect of business. Prior to the conference GA delegates noted they would have contact with a wide range of stakeholders which included:

- Government agencies e.g. CSIRO, GNS Science, ministers, state and local government;
- Industry e.g. consultants, petroleum and mining;
- Academic institutes e.g. University of Queensland;
- Societies e.g. Geological Society of London, Australian Society of Exploration Geophysics, Academy of Science; and,
- International organisations e.g. United States Geological Survey, National Aeronautics and Space Administration, and the Japanese Space System.

This suggests that the 34th IGC provided a venue for GA employees to strengthen their relationships with stakeholders and collaborate where necessary. However, 47% of GA IGC delegates, with a confidence interval of $\pm 9\%$, indicated that they were not intending to have contact with any of GA's stakeholders during the 34th IGC. It should be noted that survey respondents may not have known what activities they would be participating in, or were not aware of events which stakeholders would be at before attending the conference.

A number of GA products were finalised and launched at the 34th IGC, however, there was no formal summary available to staff or stakeholders. These included:

- The 34th IGC book; *Shaping A Nation: A Geology of Australia*;
- *Uluru and Kata Tjuta: a geological guide*;
- ASTER Geoscience Map of Australia;

- Western Australia, South Australia and Northern Territory Palaeovalleys Map; and,
- Hazard modelling tools.

Many of these products represent major work undertaken by GA and were well received by the 34th IGC delegation (Figure 3.2). For example, the feedback on the workshops developed by GA in relation to increasing regional natural disaster mitigation capacity was highly positive, with many workshop participants making the effort to thank the workshop organisers in a post-34th IGC email. Further detail is given on the 34th IGC book in Section 3.5.1, as GA dedicated a lot of resources to its production and it was well received.

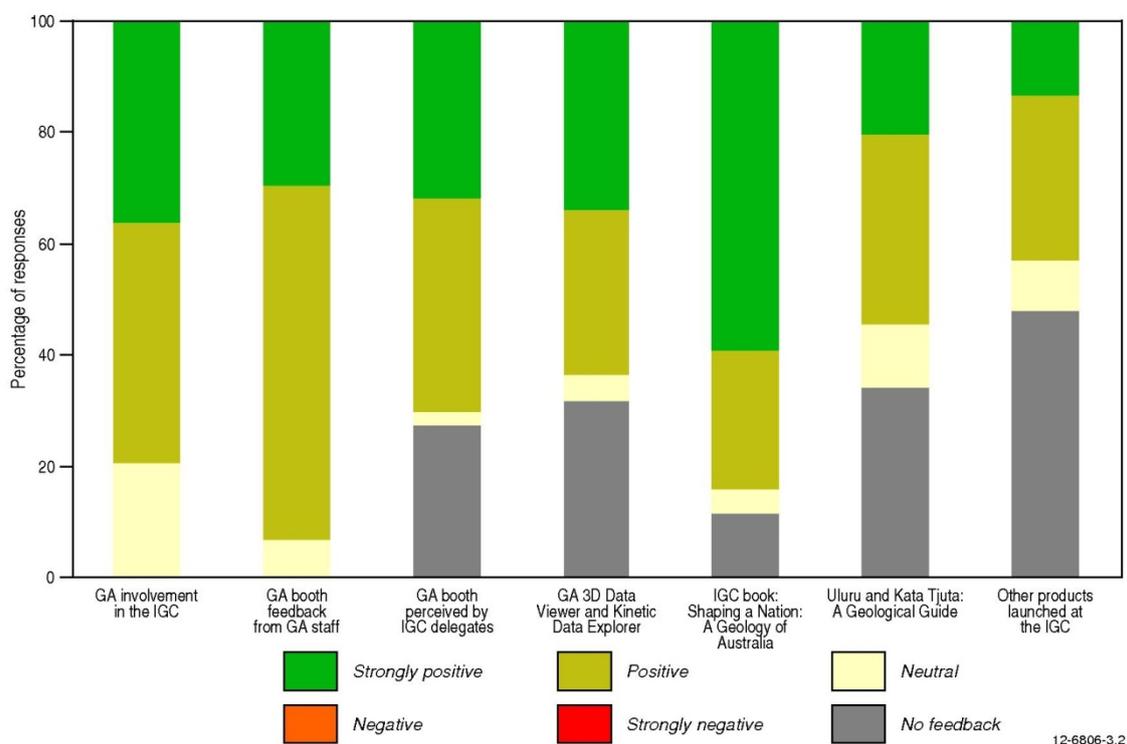


Figure 3.2: Different types of feedback received by the 44 surveyed GA staff members from other 34th IGC delegates (or from other GA staff where mentioned) on GA’s products and involvement in the 34th IGC.

Finally, the GA booth within GeoExpo allowed GA to show its capability and products to an international audience (Figure 3.2). GA’s high-quality open-access software and the usefulness of freely available data products such as that showcased by GA’s 3D Data Viewer were praised at the GA booth and very popular. It should be noted that the booth and products received no negative feedback, although this may reflect patron’s unwillingness to give criticism directly to GA employees manning the booth, suggesting that in this case surveying GA’s employees was not an effective way to gauge this information. Considering hundreds of people visited the GA booth everyday the amount of information disseminated from the booth was significant.

3.5.1. Shaping a Nation: A Geology of Australia

One of the traditions of the IGC is for the host nation to publish a book on the geology of the region. Being the national geoscience agency for Australia, GA was chosen to produce the book for the 34th IGC. The result was *Shaping a Nation: A Geology of Australia* (Figure 3.3).

Unlike a traditional geology textbook with a chronological framework, the 34th IGC book explored how geology has shaped Australia and the Australian people, and was written in a narrative style with a coffee-table, glossy format. Its intended audience was tertiary qualified geoscientists, so it underwent a rigorous review process. However, it was hoped that its production qualities and story-based approach would make it available to a broader audience (Richard Blewett, pers. comm., 2012).

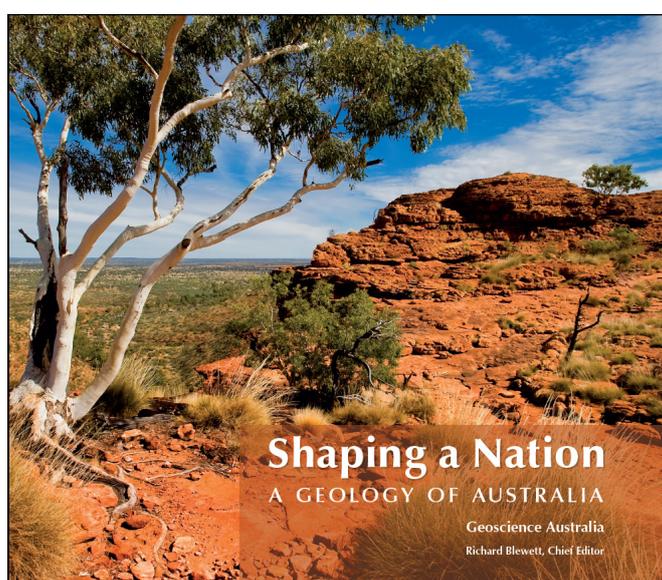


Figure 3.3: The cover of the 34th IGC book, *Shaping a Nation: A Geology of Australia*.

The 34th IGC book had a six person editorial board, 54 authors, multiple reviewers as well as production and indexing staff. It took five years to make, from concept to final product, with Richard Blewett—Chief Editor and GA employee—working fulltime on the book for three years and part time for two. The book was co-published by GA and the Australian National University (ANU) E Press. Approximately 40 of the authors were GA employees and most of the production work was completed internally by GA. The book thus represented a considerable investment by GA into the 34th IGC.

The book was launched at the opening ceremony of the 34th IGC by the Governor of Queensland, Penelope Wensley AC, and it was also sold at the GA booth throughout the congress. Online order forms were made available through GA's website (Commonwealth of Australia, 2012b). Figure 3.4 shows the web-traffic for this uniform resource locator (URL) from 26 July to 4 October 2012 from Sawmill Analytics. Sawmill Analytics is an external web company that GA contracts to monitor the traffic on its web-servers. By the end of this 70 day period there were a total of 1,901 visitors to the webpage, with a large spike of 286 unique visitors on 16 August 2012.

Sales of the 34th IGC book from its release until 6 September 2012 are summarised in Figure 3.5. Out of the total 527 sales, sales during the 34th IGC were the largest with 222 books sold (42%). In addition to hardcopy sales the book was also made available online as a PDF, free of charge, through

the ANU E Press website (Australian National University, 2012). Web statistics detailing downloads from this website were unavailable for this report. Anecdotal evidence from an interview with Richard Blewett indicated that GA had been contacted by ANU E Press for permission to convert the PDF into an electronic book format (Richard Blewett, pers. comm., 2012). From this fact it is fair to assume that the free electronic copy of the 34th IGC book has received considerable interest.

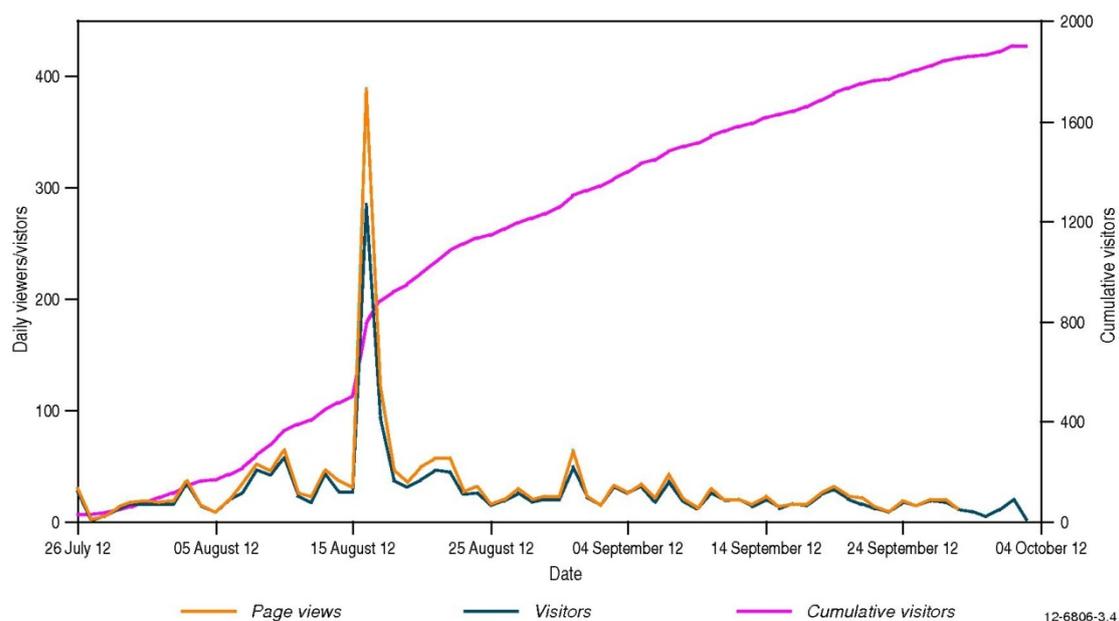


Figure 3.4: Web traffic on GA's webpage advertising 'Shaping a Nation: A Geology of Australia' (Commonwealth of Australia, 2012b) between 26 July 2012 and 4 October 2012. The left y-axis is a count of the daily views and daily unique visitors while the right y-axis is a cumulative tally of daily visitors (Flowerfire, 2012).

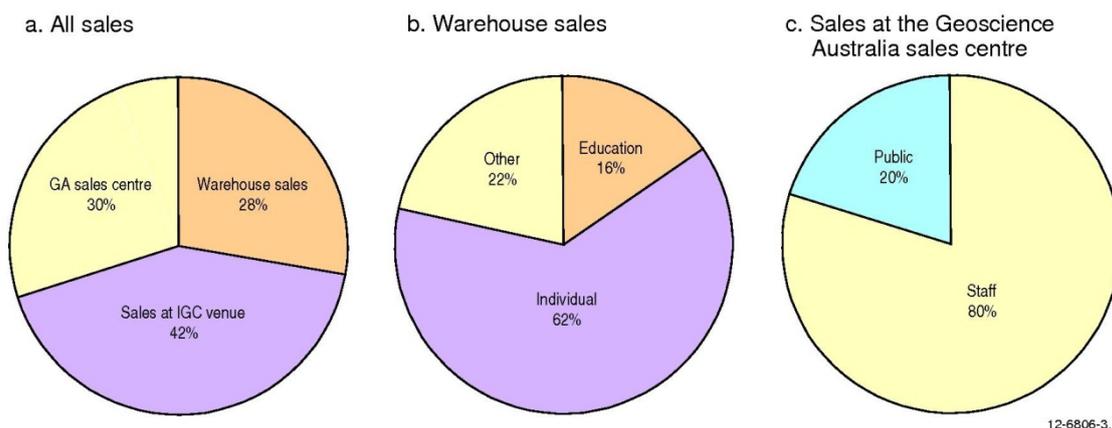


Figure 3.5: Sales of 'Shaping a Nation: A Geology of Australia' from its release until 6 September 2012. a) All sales by category. b) Warehouse sales by category. c) Sales at the GA sales centre by category.

3.6. Impacts of the 34th IGC for Geoscience Australia Employees

3.6.1. Employees that Attended the 34th IGC

The 120 GA employees that attended the 34th IGC were involved in a range of conference activities. In the pre-34th IGC survey (Appendix One) each employee was asked to rank the importance of these activities to their attendance at the 34th IGC on a scale from one to ten (Figure 3.6), with activities that they were not involved in ranked zero or not applicable.

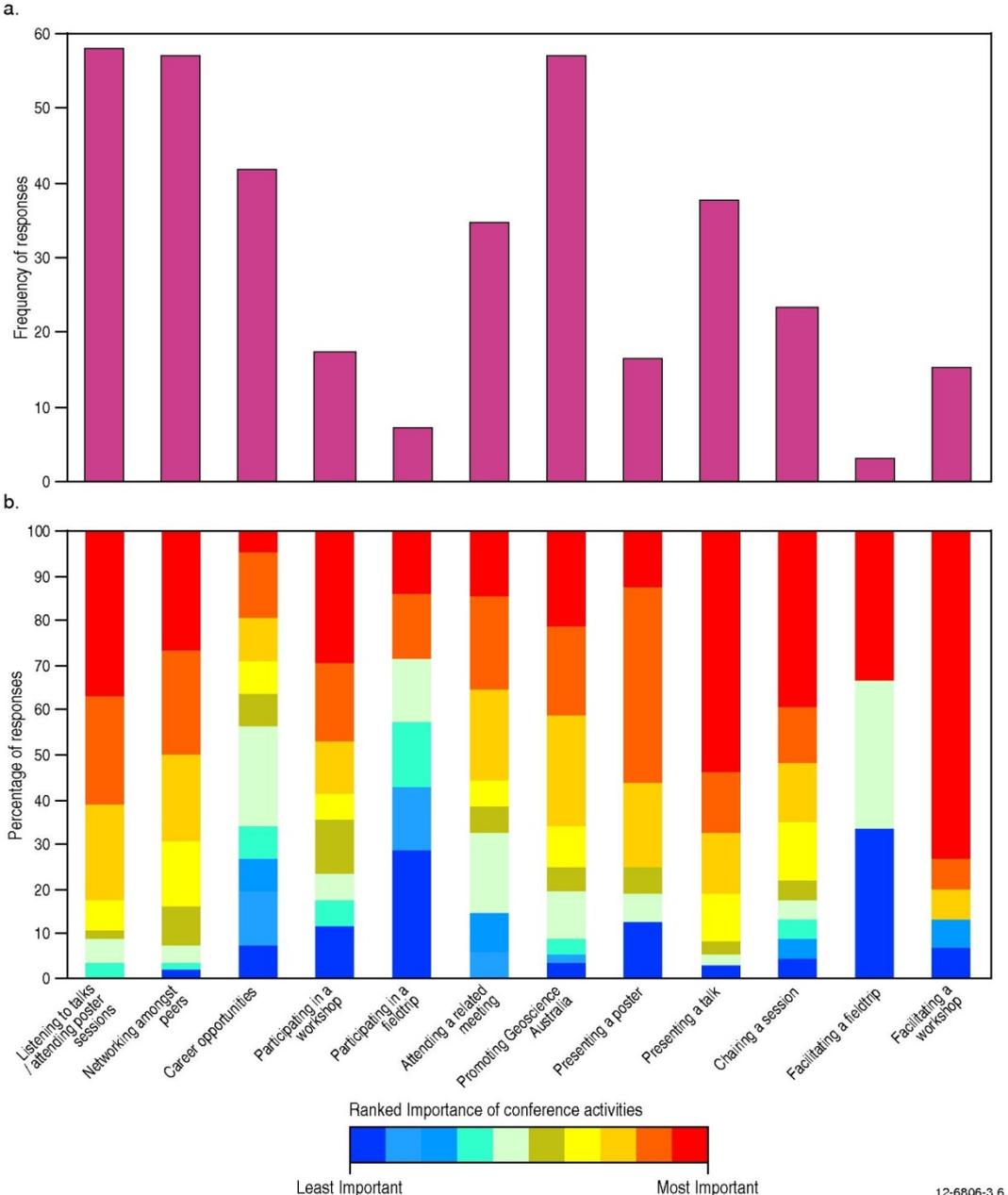


Figure 3.6: a) Frequency of pre-34th IGC survey responses for conference activities considered applicable to attendance at the 34th IGC. b) The ranked importance of the conference activities by the respondents from the pre-34th IGC survey.

The most common activities that respondents considered applicable to their attendance at the 34th IGC were; listening to talks or attending poster sessions, networking amongst peers, and promoting GA. These activities largely fit into the standard routine of conference attendance and were applicable to all delegates, and consequently ranked high in importance in the pre-34th IGC survey. It is encouraging to note that promoting the agency was considered important by many delegates. In addition, the responses indicate that GA delegates were more interested in promoting the agency than pursuing career opportunities. This could point towards a high level of job satisfaction, a lack of awareness of career opportunities at the 34th IGC, or a simple reflection that GA employees were unwilling to communicate this motivation to their employers.

Other activities, such as presenting a talk and facilitating a workshop were not applicable to all delegates, thus only a select few contributed to these fields of the survey. However, those that did undertake the activities ranked them as very important, ranking these activities higher than more passive activities such as listening to talks.

In the post-34th IGC survey (Appendix Two), GA delegates were asked to rank the same conference activities, specifically in terms of how they affected their professional development and how they affected their capacity to perform their work within the agency. The results of the five most highly rated conference activities are shown in Figure 3.7.

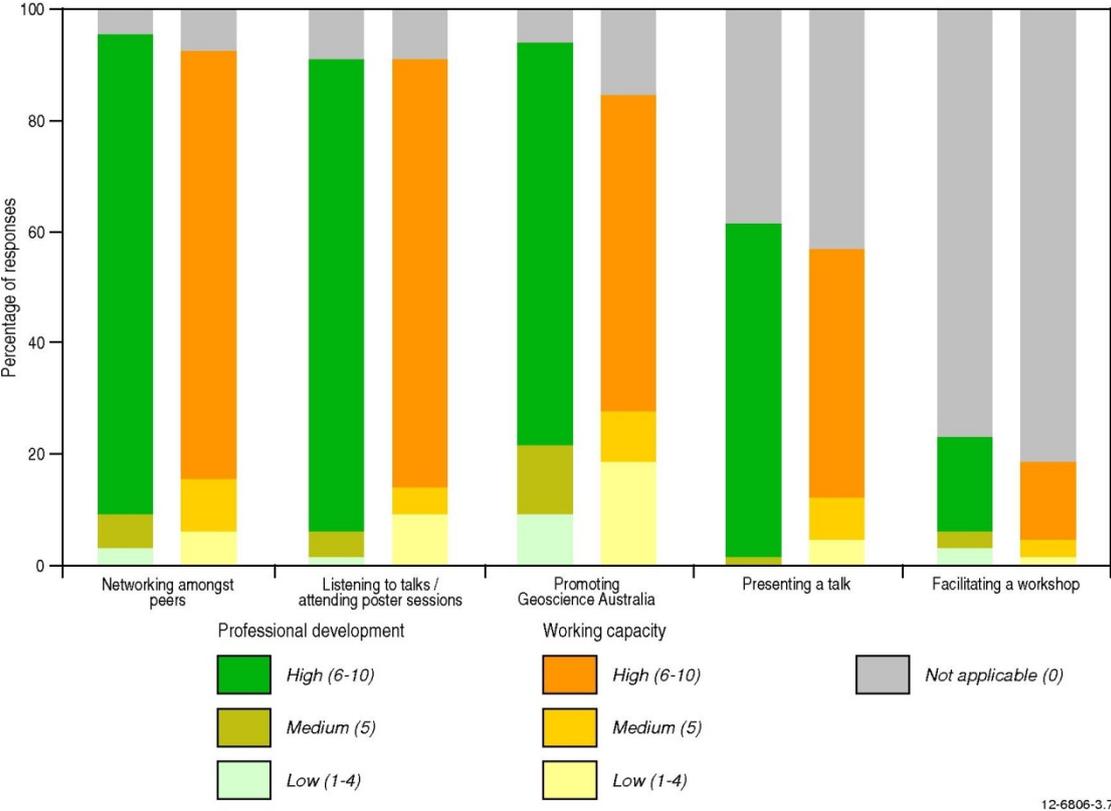


Figure 3.7: The importance of the five most popular congress activities from the post-34th IGC survey ranked from 0-10. The responses were grouped into high importance (6-10), medium importance (5) and low importance (1-4). Activities that individuals did not participate in were considered not applicable (0). The effect of these activities on professional development is shown in dark-light green, while the effect of these activities on individual's capacity to perform their work duties within GA is shown in orange-yellow.

The general trend of activities that were considered important by GA delegates was similar to the pre-34th IGC responses, indicating that the congress met expectations (Figure 3.6). In addition, delegates generally rated all of the activities that they were involved in, both pre- and post-34th IGC as highly important, indicating that the opportunity to attend the 34th IGC was valued.

Further, it was noted that rankings for professional development were consistently higher than those relating to the capacity to complete work at GA (Figure 3.7). This may indicate that delegates attended the 34th IGC specifically to increase the breadth of their knowledge, rather than simply to improve their standard work practices, or that the opportunity to attend talks at the forefront of their technical fields was not available, or alternatively some survey respondents did not fully understand the term “capacity to perform business-as-usual job requirements”. The vast scope of the scientific themes presented at the congress is unique to the IGC. This variety provided an opportunity to be exposed to a breadth of the geosciences, which was valued by GA delegates. Some text responses from the survey respondents did indicate that for some technical areas there were not many ‘in-depth’ presentations at the fore-front of their field of science but this was varied from theme to theme.

The survey responses allowed the motivations of staff attending the congress to be inferred by comparing which activities were considered most important. For example, listening to talks and attending poster sessions was considered applicable to all attendees and rated as highly important and it is likely that GA employees attending the 34th IGC were motivated to take in information broadly across the geosciences, but also wanted to learn about new discoveries and best practises in their specific fields. This inference was confirmed for GA delegates who provided specific text answers describing why congress activities were important. There was a general consensus amongst text respondents that they wanted to improve their understanding of particular fields by attending presentations that they felt would improve GA’s capability in their subject area.

Similarly, the fact that presenting a talk was considered highly important shows that surveyed GA staff were strongly motivated to share information about the work GA is involved in. The fact that these activities were highly valued, suggests that GA’s capacity to provide technical geoscientific advice to the Australian Government was enhanced by participation in the 34th IGC. This was predominantly through providing opportunities for staff to increase their awareness of current trends in the broader international geoscience community, and to receive feedback on their own work from international peers. Again, text responses from GA delegates confirmed that they were excited to receive feedback on existing work and projects through presenting a talk or a poster. These responses indicate that GA delegates were strongly motivated to enhance their individual performance and advance the work of the agency through their attendance at the 34th IGC.

Overall, respondents were pleased to have had the opportunity to attend 34th IGC and were proud of the role that GA played in organising the congress. Respondents remarked that attendance at the 34th IGC was likely a once-in-a-career opportunity. Some responses suggested that hosting the 34th IGC in Australia will have significant benefits to the Australian geoscience community in the future, while some respondents perceived that GA’s national and international reputation was greatly enhanced as a result of its attendance and support of the 34th IGC.

3.6.2. Employees that were Unable to Attend the 34th IGC

GA staff that were unable to attend the 34th IGC could still benefit from the 34th IGC in the following ways:

- Listening to 34th IGC-related talks from GA delegates;
- Listening to 34th IGC-related talks from visiting 34th IGC delegates;
- Participating in related meetings;
- Participating in related workshops; and,
- General discussions with GA delegates.

In particular, it was noted that GA hosted approximately 20 visitors in the weeks surrounding the 34th IGC (Table 3.2). During their time at GA the visitors were involved in a range of activities that facilitated further dissemination of information and initiated or extended collaboration with GA. This included the presentation talks and participation in workshops. However, it was noted that there is a lack of formal processes to register external visitors at GA. In addition there is no formal resource for GA employees to find out about who is visiting GA and what they are doing during their visit (e.g. presenting a talk). In some cases survey respondents were not aware of 34th IGC-related visitors, seminars, workshops or meetings occurring at GA, even when those activities related to their group. This suggests that GA employees may not have got the maximum benefit of hosting the visitors.

Table 3.2: Visitors to GA associated with the 34th IGC. Exposure ranked as; 1) Visitor came to discuss specific collaborations only. 2) Visitor gave a talk, hosted or participated in a workshop to a limited sector of GA. 3) Visitor came to GA, and amongst other activities presented a talk to the wider GA audience (this was advertised on the intranet or was relevant information was communicated via the divisional email lists). Information gathered during pre- and post-34th IGC surveys; additional information sourced from the GA Conference and Visiting Delegations Coordinator (Mary Walsh).

Visitor name / group	Section / group hosting	Description of activities	Exposure to GA
Professor Steve Gorelick (Stanford University) Dr Clifford Voss (USGS) Dr Jared Abraham (USGS) Professor Craig Simmons Mr Richard McLoughlin (Department of Sustainability, Environment, Water, Population and Communities)	Groundwater Group	Group presentation of talks within a Groundwater workshop	2
Professor Steve Gorelick (Stanford University)	Groundwater Group	GA seminar	3
Alex Sharples Lucy MacGregor Bjorn Wygrala	Basin Resources Group	Group seminar and presentations	2
Professor Jim Ogg (Purdue University)	Basin Resources Group	GA seminar	3
Dr Helje Parnaste (Tallinn University of Technology)	Basin Resources Group	Group meetings	1
Professor Greg Retallack (University of Oregon)	Basin Resources Group	Group meetings	1

Visitor name / group	Section / group hosting	Description of activities	Exposure to GA
Professor Gary Greene (California State University)	Coastal, Marine and Climate Change Group	Group meetings with: Coastal, Marine and Climate Change Group; Basin Resources Group; Andrew Heap; Dr Clinton Foster (Chief Scientist) Habitat Mapping presentation and workshop open to: Coastal, Marine and Climate Change Group; Observatories and Engineering Services Group; Basin Resources Group GA seminar	3
Terje Thorsnes (Norges Geologiske Undersekelse (NGU))	Coastal, Marine and Climate Change Group / Andrew Heap	Group meetings with: Coastal, Marine and Climate Change Group; Stuart Minchin (Chief of Environmental Geoscience Division); Andrew Heap GA seminar	3
Ms Irina Rafliana (Indonesian Institute of Sciences (LIPI))	International Group	GA seminar	3
Evgenia Milshtein (A.P. Karpinsky Russian Geological Research Institute (VSGEI))	Energy Division	GA seminar on: 3D multi-scale model of North, Central and East Asia	3
Sergey Shokalsky (A.P. Karpinsky Russian Geological Research Institute(VSGEI))	Energy Division	GA seminar on: Atlas of Geological Maps of Central Asia and the Adjacent Territories at 1:2.5M	3
Dr Lee Allison (Arizona Geological Survey)		GA seminar	3
Dr Eric Grunsky (Geological Survey of Canada)	Geochronology Section / Regional Geology and Mineral Systems Group	Group meetings GA seminar	3
Chinese Geological Survey	Chris Pigram (Chief Executive Officer)/ Corporate		1
6 th International SHRIMP Workshop group	Geochronology Section / Regional Geology and Mineral Systems Group	Visits to GA lab following workshop	2

3.7. Job Satisfaction

A majority of respondents (69% with a confidence interval of $\pm 8\%$) considered that their attendance at the 34th IGC had either a positive or strongly positive impact on their job satisfaction (Figure 3.8).

There were many positive comments about how participation in the 34th IGC gave staff the opportunity to try a new role, present work, represent GA to international peers, network and be exposed to a diversity of scientific topics.

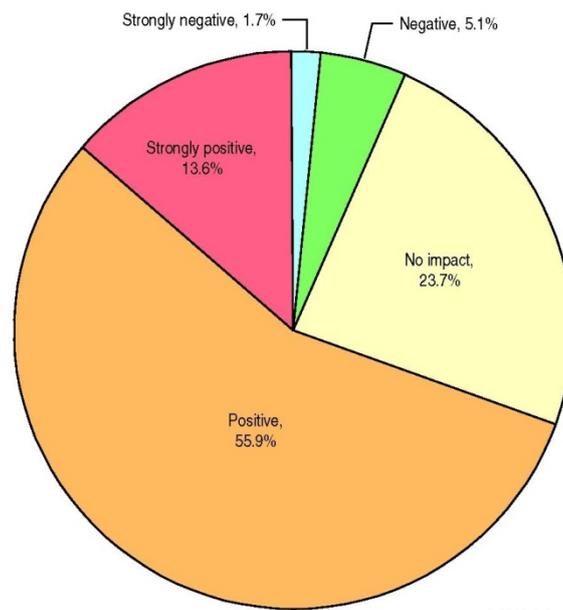


Figure 3.8: The impact of the 34th IGC on the job satisfaction of the GA staff surveyed. A clear majority of respondents considered their involvement in the 34th IGC had a positive or strongly positive impact on job satisfaction.

The 2012 GA All-Staff-Survey concluded that one of the main reasons that GA staff leave the organisation is that they feel that they do not have enough career opportunities (Voice Project, 2012b). Therefore, the increase in job satisfaction associated with participation in the 34th IGC may increase staff retention and therefore, retention of GA's capacity to provide geoscientific advice to the Australian Government. However, 18% of GA IGC delegates (with a confidence interval of $\pm 6\%$) remarked that preparation for the 34th IGC was not adequately recognised in their work plans and increased their workload to the point where it was negatively impacting on their job satisfaction. While these responses represent a small minority, it is important for GA to understand the underlying drivers of these responses. While there may be no trend, if the respondents have had exposure to a common factor, for instance negative contact with an external contractor or manager, this issue could be addressed by GA.

3.8. Conclusions

At an agency-wide level GA was able to influence the scientific program and collaborate with a wide range of stakeholders through its contribution to the 34th IGC. It was also able to showcase its work, products and capabilities through a wide range of conference activities. Participation in the 34th IGC assisted GA in meeting its vision of being the custodian for geological datasets and scientific information for Australia.

GA's capacity as the primary provider of technical geoscientific advice to the Australian Government was enhanced by participation in the 34th IGC. GA delegates increased their awareness of current trends in international geoscience and received feedback on their own work and GA products from the international geoscience community. These opportunities were highly valued by staff and their participation in the 34th IGC had an overall positive impact on job satisfaction.

The total impact of the 34th IGC for GA has been difficult to assess because no formal project proposal, with well-defined benefits or key performance indicators, was put together at the outset of the 34th IGC. This study represents the first such formal documentation of expected benefits and outcomes. The outcomes of this study include recommended metrics by which to measure ongoing 34th IGC related benefits and similar metrics for future proposed endeavours. Similarly, this study identified that whilst conference attendance by GA employees and the presence of external visitors to GA may be captured in weekly notes and Agency Management Meeting's, this information is not broadly promoted. This has meant that the benefits of the 34th IGC were not maximised to their full potential on an agency-wide scale. This study has identified a number of ways to maximise the benefits of participation in similar events in the future, but, required additional funding to implement. These suggestions form a number of recommendations outlined below and more information can be found in [Appendix Four](#).

3.9. Recommendations

1) Investigations to further assess the impacts of the 34th IGC for GA

The topic of whether GA received maximum benefit from its involvement and investment in the 34th IGC is both broad and important. Assessment of the value for GA in supporting such activities is a significant indicator of how it prioritises Government funds.

Action point 1: Further investigation into use of the newly introduced L&D form pertaining to IGC. For example, how many GA staff completed the L&D form, did it provide useful information for assessment.

Action point 2: Evaluate the benefits of the 34th IGC to the wider GA community and examine secondary effects. The surveys in this study were only distributed to GA employees that attended the 34th IGC. A survey including all GA staff would enable insight into the ongoing and subsidiary impacts of GA participation in the 34th IGC. A similar evaluation of the value of workshops hosted by GA in Canberra that were held in association with the 34th IGC could be implemented, as these were available to GA employees who did not attend the 34th IGC.

Action point 3: Investigate the longer term impacts of the 34th IGC. Undertake a survey for both 34th IGC participants and non-34th IGC participants. Use the non-34th IGC participants for comparison as control group. Groups should be targeted with strong project association at the 34th IGC. Address whether the 34th IGC affected their capacity for business-as-usual activities and for job satisfaction. This could possibly form part of the Performance Development Plan process.

2) Activities to capture maximum benefit from similar investments in the future

When GA proposes to participate and support (financially) conferences or other external activities it is vital to ensure that it assesses and captures the maximum benefits.

Action point 1: In cases where there has been a large financial outlay to an activity (for instance conferences where there is a formal GA involvement) it is important to be able to review whether the activity has met the expected outcomes. In order to do this it is necessary to have a clear outline at the outset of what the anticipated outcomes are. Therefore it is recommended that the initial proposal should clearly identify outcomes against which the activity can be judged. This condition should be integrated into GA's internal audit requirements to facilitate future cost-benefit analysis of the

proposed activity. This will ensure GA project management is compliant with the Financial Management and Accountability Act.

Action point 2: GA staff that are giving presentations for an external conference should be encouraged to carry out pre-conference talks within GA. In addition to providing a dry-run review process to improve the quality of GA presentations, this would result in an increased understanding of what goes on in separate parts of GA, as this was highlighted as an issue in the 2012 GA All-Staff-Survey.

Action point 3: Post conference sessions should be held at GA. These could be informal sessions whereby GA staff that attended a meeting disseminates the 'current state' of their subject for the benefit of fellow GA staff that did not attend.

Action point 4: Creation of a formal procedure for pre- and post-conference dissemination of information. When visitors travel to GA in conjunction with Australian based activities, the dissemination of information is not consistent or clear. It is recommended to have a document or timetable to refer to, rather than multiple emails sent out ad-hoc. An example would be the creation of an associated Intranet page capturing this information. This would require additional funding.

Action point 5: Creation of a one page list of products that will be launched at the conference for the GA staff to be able to effectively promote these products and the organisation as a whole. The list could be distributed to staff prior to the conference.

3) Organisational processes within GA relating to L&D activities and evaluating benefits

It is important for an organisation to assess the activities it carries out. Additionally, in order to do this in an efficient and consistent manner throughout the organisation it is important to have clear and accessible procedures.

Action point 1: Compile information from Overseas Reports that could be used in L&D assessments.

Action point 2: The introduction of some form of reporting for domestic conferences in a similar way to international conferences. This could also be used to evaluate the benefits of the activity.

Action point 3: Use of the 'purpose' field in the Travel Allowance Form for L&D assessment. Make completing L&D reports part of the formal process to allow GA staff to attend external activities i.e. if you do not comply with L&D reporting it will delay the distribution of TA funding.

Action point 4: Currently only internal L&D programs are evaluated for their benefits. Externally hosted training typically has a larger cost involved. Initiate a similar process of value assessment of external L&D programs as used for internal ones. In addition evaluate conferences in terms of their L&D contribution.

Action point 5: In order to implement the surveys for this study there was a degree of ambiguity as to the processes for completing a survey. For instance whether the capability existed within GA and what were the legal implications. It is recommended that formal guidelines or Standard Operating Procedures for administering an internal survey within GA be developed and available on the intranet. Surveys are an important way to assess activities and engage project participants. Allowing groups within GA to more easily implement surveys will promote their use and make the process more efficient.

4. Social Media Analysis

4.1. Introduction

The use of social media has become ubiquitous in everyday life across the globe. As a result, the 34th IGC Organising Committee decided to use social media, in the lead-up to and during the 34th IGC, as a tool for engaging with delegates and promoting the congress to a wide audience. To this end, a Social Media Plan (Rowland, 2012b) was developed. This plan was implemented by the 2012 Geoscience Australia (GA) Graduate cohort, in consultation with Rowland, who provided media relations for the 34th IGC. The 34th IGC social media campaign spanned from March to 24 August 2012.

As stated in the 34th IGC Social Media Plan, the objectives of using social media were:

- To build and maintain strategic relationships relevant to the 34th IGC;
- To engage stakeholders in conversations about geology and the Congress to drive awareness of the 34th IGC; and,
- To provide another communication channel for delegates throughout the week of the congress.

The Social Media Plan was delivered via two platforms, Facebook and Twitter. In addition to providing a means to engage with 34th IGC delegates and the public, the process of implementing the Social Media Plan provided valuable information on the use of social media in a professional capacity. This information is directly relevant to GA, whose social media guidelines are currently under review to determine in what capacity social media can and should be used as a communication tool by the agency. In the meantime, GA has started using Twitter, through the @EarthquakesGA account, to disseminate information to the public in the case of a significant earthquake within the Australian region, and on a single case basis at the 34th IGC, using the @GAatthe34thIGC account to promote GA at the congress. Furthermore, it is another example of the impacts of the 34th IGC at both an organisational and personal level.

4.2. Social Media Glossary

A glossary of terms that are commonly used within social media and this report are given in [Table 4.1](#).

Table 4.1: Social media glossary.

Term	Description
@	Character used to mention users in Tweets. When a username is preceded by an @ sign it becomes linked to a Twitter profile.
Admin	User who creates and manages activity groups and pages. A Facebook account is required to be an administrator.
Bio	A short personal description of 160 characters maximum to define who the user is on Twitter.
Chat	Feature that allows users to send instant messages to online friends on Facebook.

Term	Description
Comment	A message that users can write on a post, photograph, video or link on Facebook.
Connect Tab	Allows user to view interactions, mentions, recent follows and retweets on Twitter.
Direct Message	Private messages between sender and recipient on Twitter.
Discover tab	Shows stories, suggestions of who to follow and activity on Twitter.
Fan	A Facebook user that likes a page becomes their fan.
Friend	A person which a user is connected with on Facebook. To become friends, a friend request must be sent and confirmed by both people. Friends are able to see each others information and posts/comments.
Friend Request	To ask for permission to engage with another Facebook user.
Follow	To follow someone on Twitter is to subscribe to their Tweets or updates on the site.
Follow count	Tally of how many users follow a particular user/account on Twitter.
Follower	Another Twitter user who has followed a Twitter user/account.
Following	Other Twitter users that a user has chosen to follow.
Hash Tag (#)	Symbol that is used to mark keywords or topics within a Tweet. All messages containing hashtags can be searched and recalled.
Home	A real-time list of Tweets from those a user follows.
Interactions	Interactions are any mention and retweets a Twitter account receives.
Like	A button associated with a post, photograph, video, album or page that can be clicked to provide positive feedback to other users. To like a page means you will become a fan of the page.
Link	A Uniform Resource Locator (URL) that directs viewers to a new webpage. A link can be shared on Facebook and Twitter.
Mention	Refer to another user in a Tweet by including the @ sign followed directly by their username.
Messages	A central place to exchange private messages, chats, emails and mobile texts on Facebook.
News Feed	A continuous stream of updates posted by friends on Facebook.
Notifications	Email, onsite or Rich Site Summary (RSS) mobile updates about activity on your Facebook page, including likes, comments and shares of posts.
Pages	Allow businesses and organisations to have a profile on Facebook and connect with Facebook users. Admins can post information and News Feed updates to people who like their pages.
Profile	A Twitter or Facebook page displaying information about the user including recent posts and activity.
Ow.ly	A URL shortening web service, useful for Twitter.
Post	A message written on a Facebook wall that can contain photographs, videos, a location, a link and tag other people.
Retweet (RT)	The act of forwarding another user's Tweet to all your followers.
Rich Site Summary (RSS)	RSS is a family of web feed formats used to publish frequently updated works, such as news headlines, in a standardised format.
Share	The function of distributing another user's post on your Facebook wall.
Spam	Contacting people with unwanted content or requests.

Term	Description
Stories	Narrative created about a Facebook page, can be in the form of likes, posts, comments, shares, mentions and tags.
Tag	Links including a person, place or page to something posted on Facebook.
Tweet	140-character-long messages via Twitter.
Tweeter	An account holder on Twitter who authors and reads Tweets.
Uniform Resource Locator (URL)	The address of an internet page.
Wall	A space on a Facebook profile where the user and friends can post and share information.

4.3. Background

4.3.1. What is Social Media?

Social media is the use of mobile and web-based technologies to share, create, discuss and modify user-generated content on highly interactive platforms (Kietzmann et al., 2011). Social media platforms are varied and include micro-blogs such as Twitter, social networks such as Facebook, blogs, wikis, professional networks such as LinkedIn, bookmarking sites and user-generated photography or image sites such as YouTube and Flickr (CSIRO, 2009). However, the 34th IGC Social Media Plan focused on the use of Facebook and Twitter and this chapter reflects this focus.

Over 66% of all adult online users are connected to one or more social media platforms (MBA, 2012) with steady growth in use over the last few years, particularly in the number of Facebook users (Figure 4.1). This growth is partly due to the increasing popularity of smart-phones, as these mobile internet devices have made social media sites more accessible by facilitating real time interaction (comScore, 2011). The overwhelming popularity of social media is illustrated by the fact that an estimated one in five online minutes are spent on social media sites (comScore, 2011).

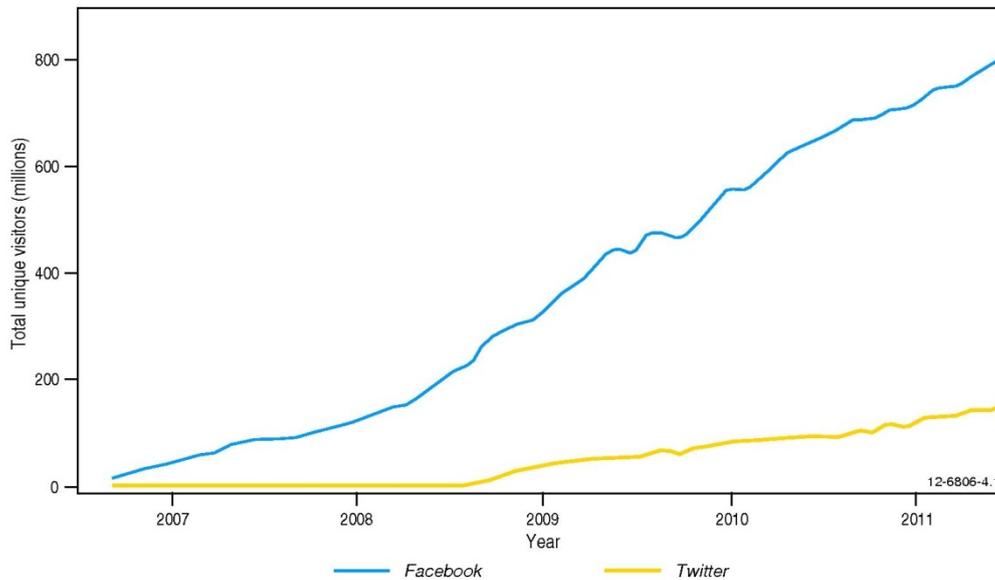


Figure 4.1: The number of unique users since 2007 for the social media sites Facebook and Twitter (adapted from comScore (2011)).

4.3.1.1. Twitter

Twitter is a real-time micro-blogging service that allows people to send and receive 140-character-long messages, known as tweets. Launched in July 2006, its popularity has grown to over 500 million active users (WebMediaBrands Inc., 2012). Users can send their tweets through any internet-enabled device and these messages can be sent either publicly or privately to other users. Increasingly, Twitter is becoming a popular medium for the rapid dissemination of breaking news and current events (Cheong and Lee, 2011). As such, the use of Twitter has not been limited to interpersonal communication among friends but has also become a central means of communication during national events such as political protests and natural disasters (comScore, 2011). To illustrate this point, a magnitude 7.6 earthquake off the coast of the Philippines was brought to the attention of the United States Geological Survey by Twitter before the seismic waves produced by the earthquake were detected by its monitoring network (MacMillan, 2012).

Twitter has a number of functions for disseminating information including retweets, hashtags and the @ symbol. Retweeting (RT) is the action of sharing another user's tweet to your followers, which helps to spread news rapidly. Hashtags (#) are a user-generated tool and are placed before words or phrases within a tweet to flag that it belongs to a particular topic. This allows people to easily search for tweets on specific topics, thereby increasing that tweet's potential reach. Finally, the @ symbol is used to direct a tweet to a particular user account as a means of fostering conversations (Table 4.1).

4.3.1.2. Facebook

Facebook was launched in 2004 and is currently the most popular social networking site in the world (MBA, 2012). Facebook allows users to share and interact with information including videos, photographs and links from other user accounts through a News Feed that appears on every user's homepage. It also facilitates the organisation of events, allows people to message in private, allows users to chat online and has a video call function.

Organisations can use Facebook as a platform to engage with the public, through the use of Facebook pages. A Facebook page, as opposed to a Facebook profile for an individual, is a public profile created for a business, brand, organisation or celebrity. Facebook pages do not gain friends but fans, who are Facebook users that choose to like the page. Administrators (admins) of a page update its content with posts, photographs, events and videos that appear on the news feeds of the fans. Fans of the page can communicate with the organisation by posting publicly to the page (this feature can also be disabled), or sending private messages which are viewed by page admins (Table 4.1).

4.3.2. Demographics

A survey of social media use in the United States of America (MBA, 2012) provides an insight into the demographics that different social media platforms access (Figure 4.2). For example, users spend about twice as long per visit on Facebook than Twitter. The age demographic of Twitter is substantially younger than Facebook. Users of both sites reported similar levels of education; more than 80% of users have at least some tertiary education. Both of the sites are predominantly used by females, with a slightly stronger bias for Twitter users. These observations are supported by a separate worldwide study based on Google datasets (Ignite, 2012). A similar study conducted in the United Kingdom reported broadly consistent trends (Dwivedi, 2012), though the Facebook age demographic was less skewed towards the over 45 age group (25-34 being the dominant user group). However, 95% of the Facebook user population were in the adult age group, which is relevant for organisations using social media to target working professionals.

4.3.3. Social Media and Organisations

Social media provides a cost effective means of engaging with a broad audience spanning many demographics, making them attractive to businesses, government and non-profit organisations (CSIRO, 2009). An organisation can use social media platforms, such as Twitter and Facebook, for:

- Raising awareness;
- Proposition;
- Management of issues;
- Education;
- Recruitment; and,
- Dissemination of information.

It is important that organisations that use social media in a professional capacity have comprehensive guidelines regarding use for employees. If managed poorly, the use of social media presents a potential risk to the organisation. For example, the social media community have come to expect timely responses, and therefore, slow responses can be negatively perceived. Some user-generated content may also be sensitive to the organisation and needs to be handled swiftly and appropriately (CSIRO, 2009). As a consequence, an organisation's social media presence needs to be planned, updated regularly, monitored, moderated, promoted and responsive to audience comments and questions (CSIRO, 2009). However, it is important to note that the amount of attention and maintenance required is specific to the platform, or platforms, used by the organisation and micro-blogs such as Twitter can be very resource intensive and require regular attention.

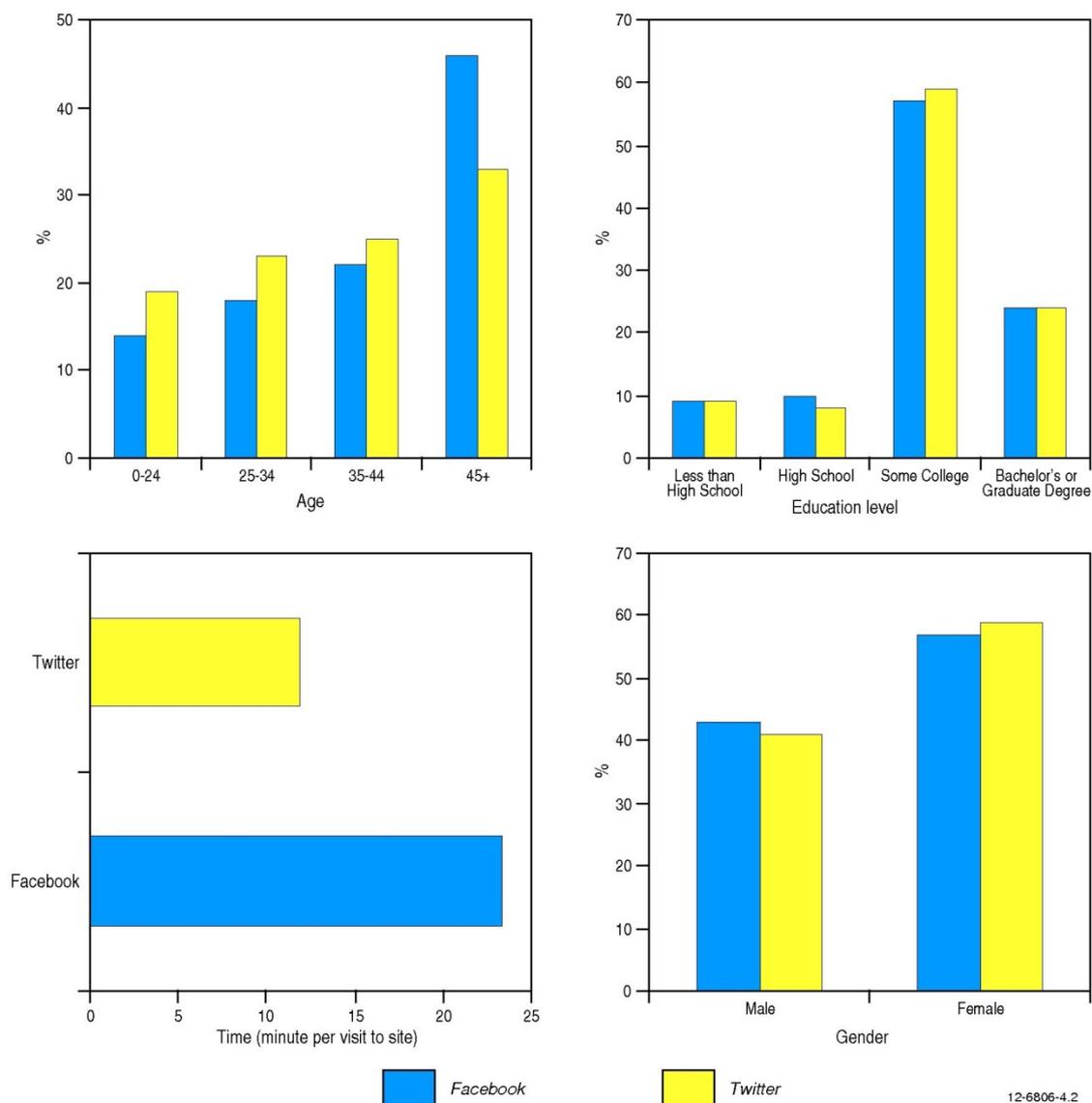


Figure 4.2: Facebook and Twitter demographic information based on a survey of internet usage in the United States covering age, gender, education and time per visit (MBA, 2012).

4.3.4. Social Media and the Australian Government

The Australian Government encourages the appropriate use of social media by Australian Public Service (APS) agencies in accordance with:

- Public Service Act 1999;
- APS Code of Conduct;
- APS Values and Code of Conduct in Practice: a guide to official conduct for APS employees and Agency Heads; and,
- Agency-level policy and guidelines.

The Government 2.0 Taskforce, which was formed to advise the government on how web technologies could be utilised to deliver better services in 2010, made a recommendation that the

Australian Government should encourage public servants to engage online. The Declaration of Open Government (Commonwealth of Australia, 2008) states that the Australian Government “is committed to open government based on a culture of engagement” and that; “Citizen collaboration in policy and service delivery design will enhance the processes of government and improve the outcomes sought. Collaboration with citizens is to be enabled and encouraged. Agencies are to reduce barriers to online engagement, undertake social networking, crowd sourcing and online collaboration projects and support online engagement by employees.” These outcomes can be achieved through the use of social media.

The Australian Public Service Commission (APSC) released a circular in 2012 titled *Revisions to the Commission’s guidance on making public comment and participating online* (Commonwealth of Australia, 2012a), which provided further guidelines for public service employees to make comments online in both an official and unofficial capacity. This circular reinforced that employees are able to comment online in an official capacity but remain bound by the APS Values and Code of Conduct. The Australian Government also provides information about the correct way to introduce and use social media platforms within an agency (Web Guide, 2012).

Many Australian Government agencies are using social media effectively including the Australian Bureau of Statistics, Australian Taxation Office and the Commonwealth Scientific and Industrial Research Organisation (CSIRO). A comprehensive list of social media pages run by Australian Government Agencies has been compiled and is available online (Australian Government, 2012). An example of a government agency using social media to great effect is CSIRO, another science agency with a diverse research program and a wide range of stakeholders. CSIRO maintains an active presence on Facebook and Twitter and could provide a relevant role model for GA’s use of these platforms. The CSIRO Facebook page currently has over 16,000 fans and they post information daily to their wall on a variety of topics including: recruitment opportunities, such as indigenous cadetships; general scientific news; photographs and information from fieldwork; national events such as biodiversity month and scientific achievements. Vibrant photographs are used to add visual impact to the information and stimulate viewer interaction. Their Twitter account, @CSIROnews, similarly reaches a wide audience with 11,300 followers and releases tweets multiple times a day (usually three times or more) on a wide range of topics relevant to the organisation. The majority of these tweets provide a brief description of the subject that is supported by links to sources of additional information or photographs.

4.4. Implementation

Rowland, a corporate communication advisory firm based in Brisbane, provided pro bono media relations and assistance for the 34th IGC Organising Committee and put together the 34th IGC Social Media Plan, which was presented to the 2012 GA Graduate Cohort in early April for implementation. Rowland were available for advise as needed and managed the social media accounts in the week leading up to and during the conference. Managing of the accounts ended on 24 August 2012.

The 34th IGC Twitter and Facebook accounts were managed by two people every business day who acted in the roles of Content Manager and Content Support. These roles had the following responsibilities:

Content Manager

- Manage external communication to engage with the social network;

- Train Content Support;
- Update Facebook at minimum once, at maximum three times a day and Twitter at least three times a day;
- Respond to posts and comments within one business day;
- Search for relevant and up-to-date content; and,
- Identify influential stakeholders and contact them through social media channels to support the 34th IGC.

Content Support

- Manage monitoring and reporting on social media;
- Use Facebook search to monitor public posts about the 34th IGC;
- Use Twitter advanced search to monitor tweets about the 34th IGC;
- Search keywords on Social Mention;
- Complete the weekly social media monitoring report; and,
- Export the weekly statistics from Facebook Insights.

Both the Content Manager and the Content Support were expected to spend 30 minutes each rostered day to complete the responsibilities outlined above. However, it was found that the Content Support person spent 10 minutes a day on the tasks and the Content Manager spent 60 to 90 minutes a day, depending on the person and working style.

4.4.1. Social Media Page Content

The Content Manager was responsible for finding and posting content each day on the social media sites. An explanation of how this was achieved is given in [Appendix Five](#). Content on the social media pages included general housekeeping messages, such as:

- Registration deadlines;
- Information and biographies of the plenary speakers;
- Abstract updates; industry related issues;
- General scientific news; and,
- 34th IGC field trip promotion.

General housekeeping and conference administration messages were provided by the 34th IGC Organising Committee but were posted sparingly to avoid spamming followers with information that they could easily find themselves.

The main type of information posted on both sites was scientific and geological news. Google Alerts and Google Reader were used as preliminary tools for searching and finding relevant and interesting topics. This allows the user to define search terms in Google Alerts, and when terms are mentioned or used on the internet an alert is sent to Google Reader. Google Alerts currently offers six variations of alerts: news, web, blog, comprehensive, video and groups. The advantage of using such a system is that the user does not need to redefine the search terms each day, and can track key topics over an extended period of time. This allowed new stories or media coverage of the 34th IGC and plenary speakers to be identified and available immediately for the Content Manager.

It was decided that two of the field trips associated with the 34th IGC would be advertised each week on the social media sites to promote registration until it closed. Field trips were advertised at the beginning and end of each week by posting a photograph and description to encourage participation by followers and fans. Additionally, to promote interaction from fans on the Facebook page a photograph competition was initiated and hosted. It was titled *Post your Favourite Geoscience Photograph* and participants were encouraged to post photographs of geoscience related phenomena. A weekly winner was selected and an overall winner was chosen by the president of the 34th IGC, Dr Neil Williams, and awarded a copy of the 34th IGC book (Section 3.5.1). A secondary competition was run where fans were encouraged to post photographs of the 34th IGC tie/scarf and an overall winner was again selected by Dr Williams and presented with a copy of the 34th IGC book. The second competition was not as popular, probably due to the limited availability of 34th IGC ties and scarfs.

Although the content posted on Twitter and Facebook pages was very similar, the format of the information posted was quite different due to the varied nature of the social media platforms. The differences are described in more detail in Appendix Five. It should also be noted that during the conference, when Rowland was managing the pages, the focus the social media changed from driving awareness of geology to posting content that is known to drive traditional media exposure.

4.4.1.1. Hootsuite

Hootsuite is a free online social media dashboard and management tool (<http://hootsuite.com/>). It allows users to integrate and manage their social media accounts supporting, multiple social media platforms: Facebook, Twitter, LinkedIn, Google+, Foursquare, Mixi, Myspace, Ping.fm and WordPress (Hootsuite, 2012).

An account was started for the 34th IGC to help with the content management and monitoring of the Twitter account. Hootsuite allowed the scheduling of tweets and retweets along with the capability to alter the tweets before they are retweeted (Figure 4.3). This meant that the official 34th IGC hashtag could be added to tweets that the content manager decided to retweet. This feature is not currently offered by Twitter. The ability to schedule tweets and retweets to be staggered throughout the day was also a useful function in Hootsuite, as it allowed the 34th IGC Twitter account to be updated once a day but have the appearance of being regularly updated. This saved the Content Manager time.

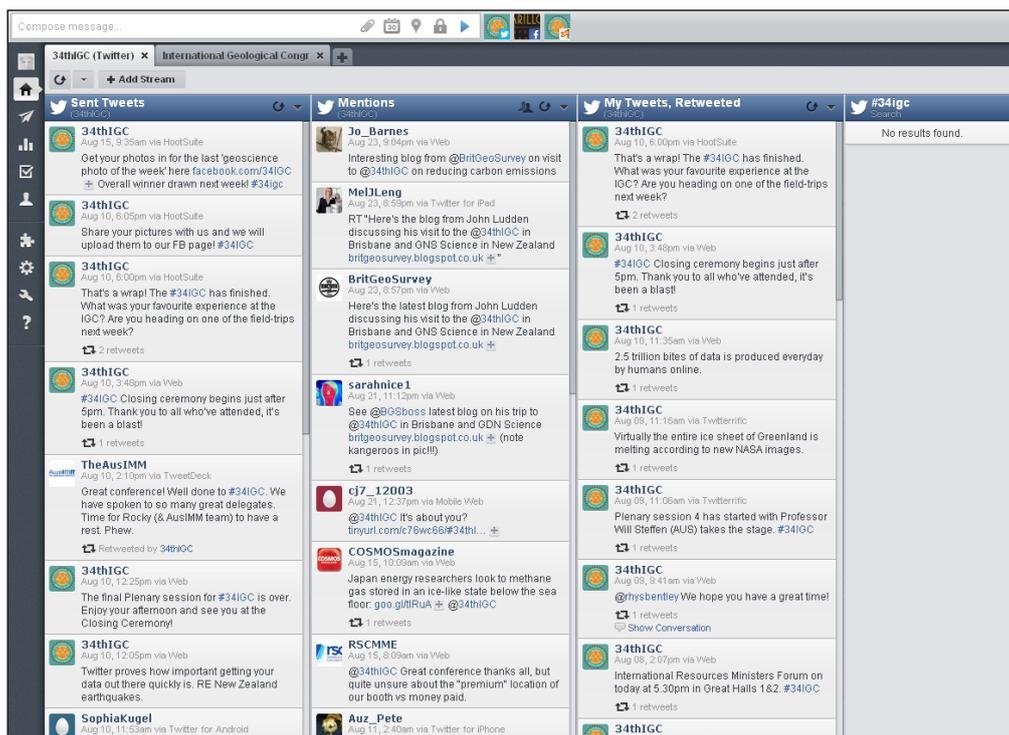


Figure 4.3: Screenshot of the Hootsuite dashboard of the 34th IGC Hootsuite account showing the multiple live Twitter feed used to manage the 34th IGC Twitter account. The feeds visible, from left to right are: our Sent Tweets; our Mentions; our tweets that have been Retweeted; and, tweets containing '#34igc' (the official 34th IGC hashtag).

4.4.2. Social Media Monitoring

As set out in the 34th IGC Social Media Plan, the person in the Content Support role monitored the Twitter and Facebook pages each working day. Content Support reported on the pages by filling in a table once daily for the preceding 24 hours, or preceding 72 hours if monitoring on a Monday to account for the weekend (Table 4.2). The differences in the monitoring of Facebook and Twitter accounts are described in more detail in Appendix Five.

4.4.3. Advertising

It was recognised that it was critical to advertise the Twitter and Facebook pages of the 34th IGC in order to raise awareness of the pages and develop a fan base. Many people were extensively consulted in order to produce and distribute the advertisements including, members of the 34th IGC Organising Committee, Carillon Conference Management (CCM) and Rowland, which involved a lot of time and resources. Table 4.3 describes the advertising produced for the social media pages and Figure 4.4 is an example of one of the advertisements.

Table 4.2: The34th IGC Social Media monitoring report. Week Twelve (23/6/12)



	Monday	Tuesday	Wednesday	Thursday	Friday
Facebook					
Likes of Page					
Number of wall posts by us					
Number of wall posts by fans					
Likes of Wall Posts					
Number of shares by fans					
Number of shares by us					
Twitter					
Number of followers					
Number of retweets					
Number of mentions (excluding retweets)					
Social Mention					
Number of additional articles					
Content Manager					
Number of posts					
Response time					

Table 4.3: Milestones in the advertisement of the 34th IGC social media accounts.

Date	Method of advertising
28 May 2012	An email was distributed to an email list including registered delegates, sponsors, exhibitors and other stakeholders to advertise the 34 th IGC Twitter and Facebook pages.
28 May 2012	Twitter and Facebook logos were placed on the 34 th IGC website embedded with direct links to both pages.
16 July 2012	The Fifth Circular was distributed to delegates via email. The circular contained an advertisement for the social media pages.
23 July 2012	An email containing a survey was distributed to delegates that contained the Twitter and Facebook logos linked to the 34 th IGC social media accounts.
5 to 10 August	Advertisement slides were shown in the exhibition halls during the conference.
5 to 10 August	The program was distributed to all delegates at congress, which contained an advertisement for Twitter and Facebook.



[34IGC Website](#) | [Contact us](#)

34thIGC Now on Facebook & Twitter

Dear Geoscientists around the World

We are excited to announce the 34th International Geological Congress (IGC), to be held in Brisbane from 5 -10 August 2012, is now on Facebook and Twitter.

Don't wait until August to participate in the 34th International Geological Congress. Join the conversation now on Facebook and Twitter.

By liking our Facebook page or following up on Twitter, you can engage with scientists from around the world, share your favourite geoscience photographs, debate the hot topics, and stay up-to-date with the latest information before and during the Congress.

You can find the Facebook page at www.facebook.com/34IGC and the Twitter account using [@34thIGC](#). Don't forget to include the [#34igc](#) hash-tag when tweeting about the conference!



For further information on the 34th IGC visit: www.34igc.org

Get on board now to prepare for your 34th IGC experience.

[Send to a friend](#)

[More...](#)

Figure 4.4: A copy of the email advertising the 34th IGC social media accounts sent to the 34th IGC mailing list on 28 May 2012.

4.4.4. Social Media Analysis

At the end of the monitoring period, 24 August 2012, the individual weekly monitoring reports were collated for further analysis. The monitoring reports provided a continuous record except for the week of 14 May 2012 and several isolated single day occurrences where no data was recorded. In addition to the data produced by manually monitoring of the sites, Hootsuite and Facebook provided some additional statistics and metrics that were used in the analysis. The convenience and comprehensiveness of the automatically collected statistics made the manual methods largely redundant for Facebook.

The 34th IGC Hootsuite account provided statistics on all retweets and mentions, as well as copies of them. These copies were stored in a separate document in the Twitter database, and were

categorised and analysed manually based on their content. From 3 to 24 August 2012 the number of tweets using the official 34th IGC hashtag was also recorded. Copies of each tweet included the hashtag during this period, and their associated metadata, were additionally gathered using Google Reader. They were not analysed or examined in great detail as a part of this report.

4.4.4.1. Facebook Insights

Facebook Insights is a service included as a part of a Facebook fan page that allows administrators of the page to check key metrics, such as demographics and reach of the page. It is an incredibly powerful tool for real-time monitoring of the effectiveness of a Facebook page and can quickly be retrieved. The Insights platform allows administrators of a Facebook page to analyse and understand trends within demographics and user growth, as well as the creation and consumption of content. The information provided is anonymous, aggregated insights about people's activity on the page. Using this information an administrator is able to improve their communication and create better experiences for the page users (Facebook, 2012). It also has a function that allows these metrics to be exported into a spreadsheet.

4.5. Analysis of the Social Media Pages

4.5.1. Who was Engaged

The key metrics of the Facebook and Twitter accounts at the end of the monitoring period are given in [Table 4.4](#). The table shows that Twitter was updated twice as much the Facebook page, which reflects the micro-blogging nature of the Twitter platform. The Facebook page reached nearly 1,000 fans. As the 34th IGC was attended by 6,012 delegates, the Facebook page reached approximately 16% of delegates (if it is assumed all fans attended the conference). This means the Facebook page was a very powerful tool for reaching delegates and disseminating information as needed.

Table 4.4: A summary of key metrics for: a) the 34th IGC Twitter account; and, b) the 34th IGC Facebook account, at the end of the monitoring period, 24 August 2012. ¹Includes all post types (photographs, links, videos, status updates, shares) made by the 34th IGC Facebook account; ²Total shares (by fans) of all posts authored by the 34th IGC; ³Total likes (by fans) of all posts authored by the 34th IGC, which contains multiple likes from individual fans.

a)

Followers	Following	Tweets	Retweets	Mentions
216	458	439	89	133

b)

Fans	Posts ¹ by 34 th IGC	Shares by fans ²	Total Likes ³ of 34 th IGC posts ³
996	226	584	5061

Notably the Facebook page had five times the number of fans than followers on Twitter. This could be due to a number of reasons. Firstly, there was inexperienced in using Twitter relative to Facebook as prior to this project none of the managers had a Twitter account, while nearly all had a Facebook

sites were very similar throughout the monitoring period and are now going to be examined in greater detail.

Many of the rapid increases coincided with either milestones in the advertising campaign of the account (Table 4.3), increased user generated interaction, or key events in the 34th IGC calendar irrespective of who was managing the accounts (Figure 4.8). These rapid increases were during the following time periods: 4 to 7 May 2012; 28 to 30 May; 6 to 8 June; and, 5 to 10 August 2012. The largest increase occurred around 28 May and shows the power of advertising the social media pages. Before this date the number of followers and fans was small and consequently, it was very hard to generate user interaction and content. However, around 28 May the sites were advertised to delegates of the 34th IGC through an email sent to all registered delegates, those submitting abstracts, sponsors, and organisations. In addition icons hyperlinked to the social media accounts were added to the 34th IGC website. These advertisements caused the number of followers to grow to 100 on Twitter and the number of fans on Facebook spike to 400. The larger number of people led to much more interaction on the social media pages and made content management easier. Figure 4.8 also shows that the pages were advertised to delegates several more times before the congress and these periods corresponded to small rapid increases in the number of followers and fans. However, it should be noted that producing these advertisements took a considerable amount of time, which should be taken into consideration when planning a social media campaign or strategy.

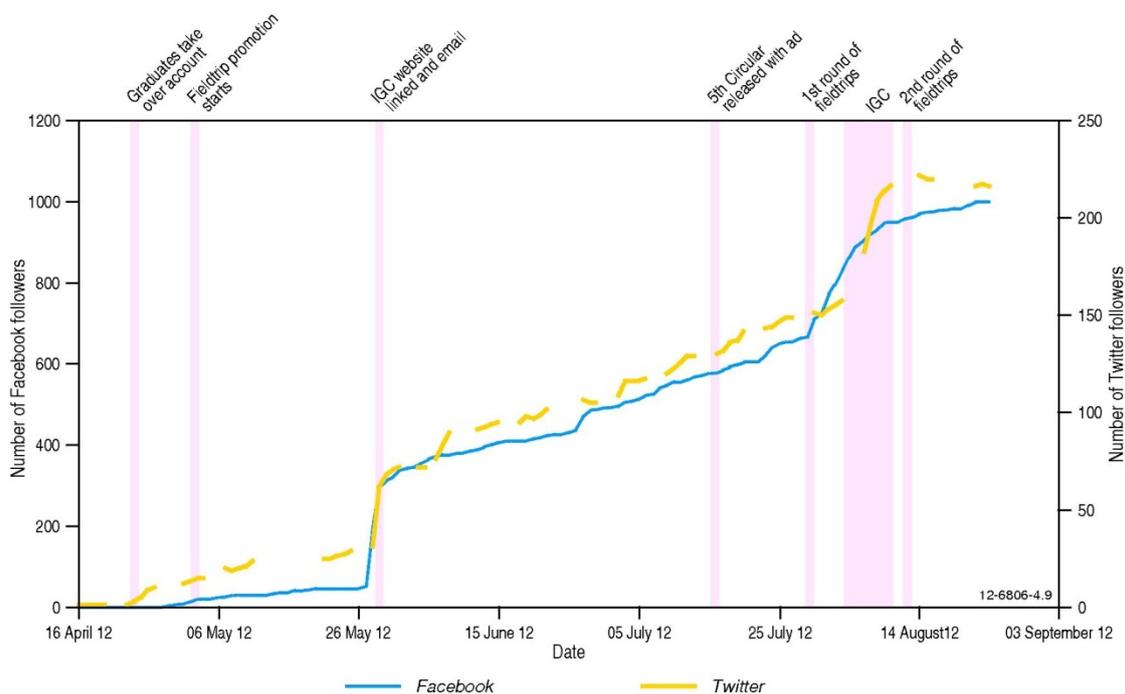


Figure 4.8: The number of followers of the Facebook and Twitter accounts from 16 April to 24 August 2012. The left-hand y-axis measures the number of Facebook followers and the right-hand y-axis measures the number of twitter followers. The dates of important events in the lead-up to the 34th IGC are also shown with purple bars.

Posting interesting information on the social media sites can also lead to an increase in fans and followers, as interactions with the post can lead to the page being advertised widely within social media. This occurred on the 26 June when a picture of a slice of cake showing stratigraphic relationships was posted on the Facebook page and generated a lot of user interaction (Figure 4.9).

The final large surge in fans and followers on both sites occurred between 5 and 10 August, which corresponds to the date of the congress. The social media accounts were advertised in multiple ways during this period, including within the 34th IGC timetable and on large screens in the centre of the exhibition hall. However, it is also probable that some people were not interested in becoming fans of the social media sites, particularly Twitter, until the congress commenced because they believed the pages would be a good way to receive house keeping information during the congress, such as room changes. Therefore the spike in the number of fans and followers cannot necessarily be attributed to the congress advertisements.



Figure 4.9: Stratigraphic cake photograph that produced a spike in the daily number of likes and stories created about the 34th IGC Facebook page (Khol[?], 2007).

There is a decline in Twitter followers that coincided with the end of the 34th IGC and the end of active updating of the site, suggesting that Twitter lends itself to the present and the future, as opposed to the past. This is consistent with the micro-blogging nature of Twitter and the fact the people usually tweet about what they are doing in the present. On the other hand people seem to use Facebook pages as both a source for interesting information and to signify their approval or preference for the organisation that the page represents. Thus the number of fans continued to increase on the 34th IGC Facebook page despite the end of the congress.

4.5.3. How Interaction Changed Over Time

Interaction, in a social media context, refers to how much active participation and engagement the content produced by an account is receiving. In the case of Twitter this refers to how many retweets and mentions an account receives, along with the number of times the official hashtags were used. In terms of Facebook this refers the number of stories created about the page, which includes how many likes, comments or shares a post receives, as well as the number of fan posts and private messages the account received.

The followers' interaction with the 34th IGC Twitter account was fairly low throughout most of the monitoring period, until the start of the congress when it rose sharply and peaked on 7 August with 145 interactions and falling off after 14 August to pre-peak levels (Figure 4.10). The largest proportion of this increase in Twitter interaction was an increase in the use of the official hashtag (#34igc) which reached a peak of 119 on 7 August. This surge in interaction most likely reflected the fact the congress was happening in the present and people wanted to write about it. This is consistent with the well known fact that Twitter, which displays tweets in reverse chronological order, lends itself to real-time, breaking news and events (Cheong and Lee, 2011).

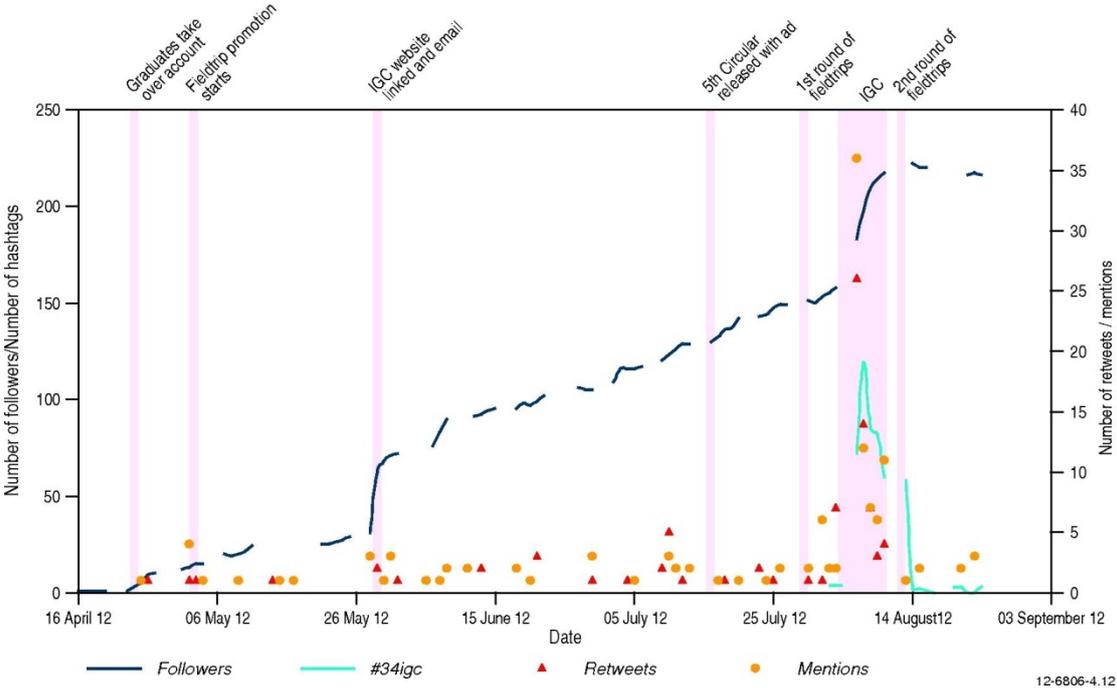


Figure 4.10: Number of Twitter followers, retweets, mentions and official hashtag usage of the 34th IGC Twitter account through time. The time period for the followers, retweets and mentions was 16 April – 24 August 2012 and the time period for the official hashtag was 3 – 24 August 2012. The left-hand y-axis measures the number of followers and usage of the official hashtag and the right-hand y-axis measures the number of retweets and mentions of the account. Important events in the lead up to the IGC are shown with purple bars.

Facebook interactions are more episodic and seemingly random than those on Twitter, with the largest period of interaction occurring as a distinct spike on 26 June and a separate more sustained period of interaction from 27 July until 8 August (Figure 4.11). The first peak can be attributed to the popular cake post and the second, the lead-up and commencement of the congress.

When the Facebook and Twitter interactions are compared (Figure 4.12) it is clear that the Facebook account received a surge in popularity in the week preceding the congress. In contrast, the surge in interactions on Twitter occurred during the congress itself. These different surges, as mentioned in the Section 4.3, probably stem from the differences in the platforms themselves, with Twitter being much more popular when events are occurring in real-time or as a medium where people communicate their current experience and thoughts. Meanwhile there was a surge in Facebook interactions before the 34th IGC as people started thinking and preparing for it. The relative drop in Facebook interactions during the event may have been the result of many delegates, some of whom were presumably fans of the Facebook page, not having time to interact on Facebook. Another possible explanation was that

a majority of the fans of the Facebook page were not delegates but people with an interest in geology and geosciences, and that this drop in interaction was the result in the transition from posting information to drive the awareness of geology in the lead up to the conference to posting more specific conference related information during the conference.

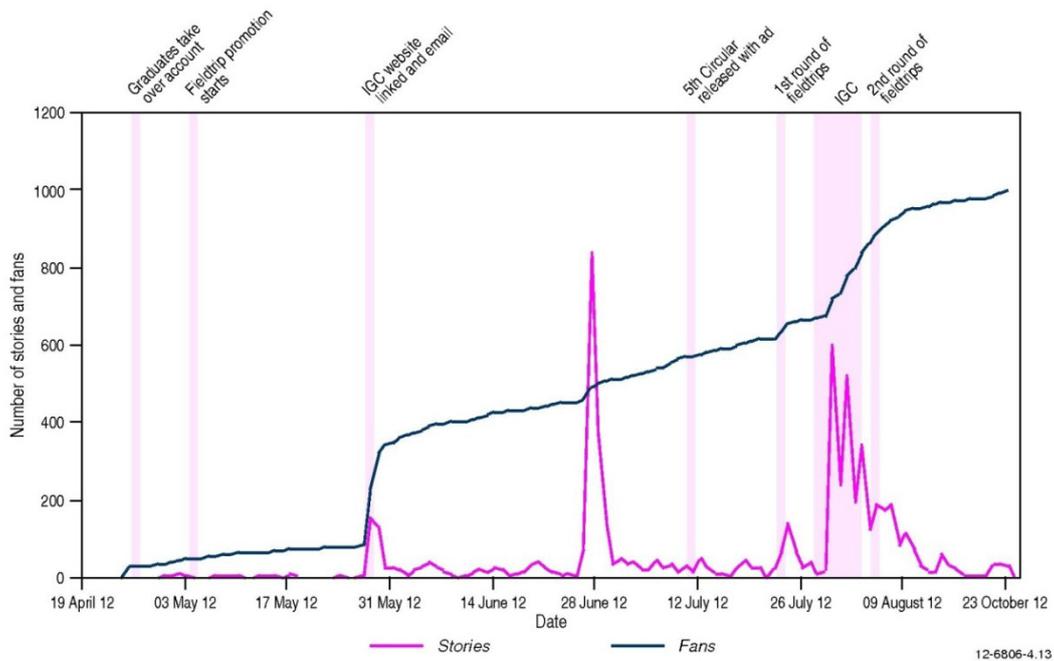


Figure 4.11: The daily number of stories created about the 34th IGC Facebook page by unique users. These stories include liking the page, posting to the page’s wall, liking, commenting on or sharing one of the page posts, answering a question posted, RSVPing to an event, mentioning the page, photo-tagging the page or checking in at the event. Important events in the lead up to the IGC are shown with purple bars.

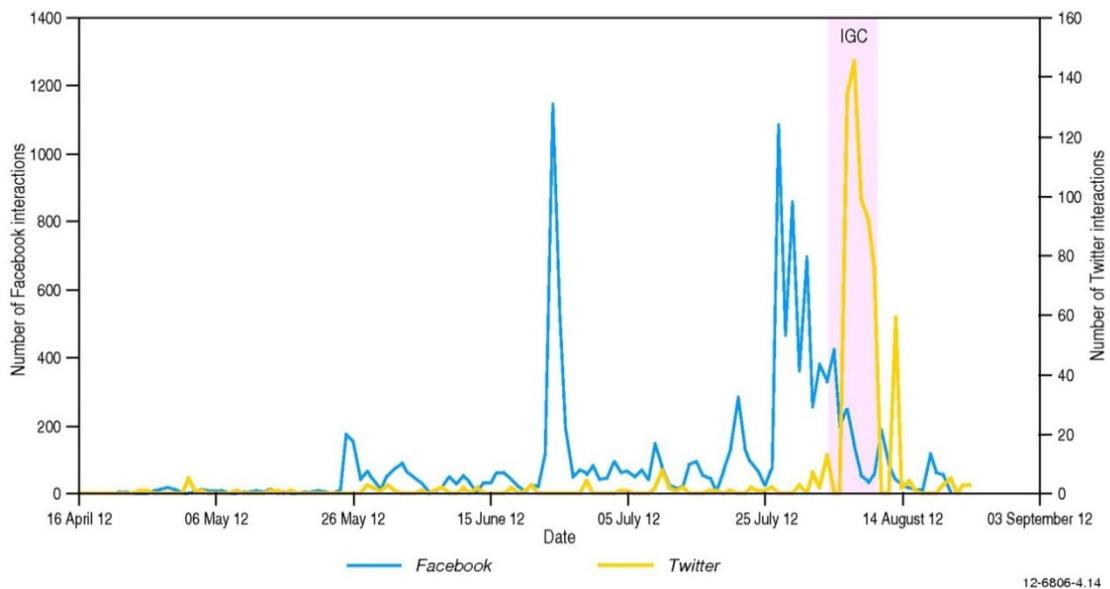


Figure 4.12: The number of interactions on the Facebook and Twitter accounts from 16 April - 24 August 2012. Interactions in a Facebook context refers to the number of likes, clicks and comments on the page’s posts along with posts by fans on the page (e.g. photocomp entries). Interactions in a Twitter context refer to the number of mentions, retweets and tweets containing the official hashtag.

4.5.4. Interaction by Post Content

4.5.4.1. Twitter

It is also important to examine and analyse the type of the content that was interacted with, as well as who was interacting with it. By learning from successes and failures of different types of posts a more effective social media posting strategy can be developed for the future.

Firstly, the 34th IGC Twitter account's retweets were analysed (Figure 4.13) and showed that tweets with links were much more likely to get retweeted by followers than unlinked tweets with 32% and 20% respectively. This is in agreement with other studies, where it has been found that users of Twitter are more likely to interact with tweets that contain technical information (Chen, 2011), particularly if it is from a trusted source (Vinter, 2012). Retweets that did not contain links were usually quotes and non-validated facts from plenary sessions at the congress.

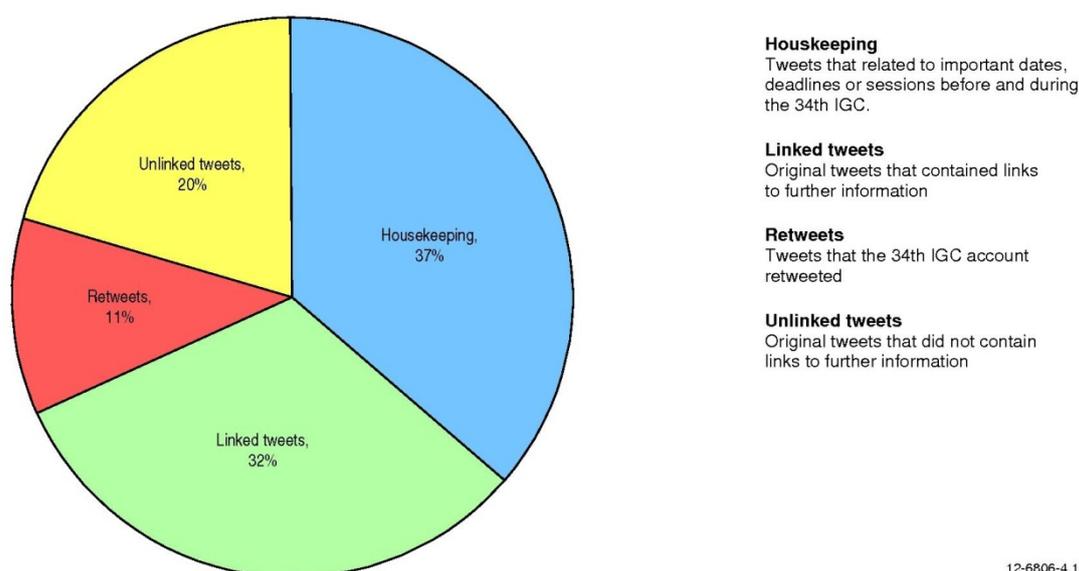
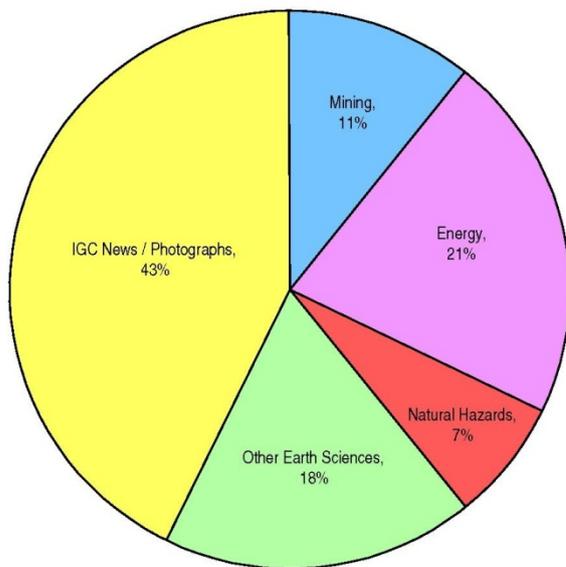


Figure 4.13: The 34th IGC Twitter account's tweets that were retweeted by category. Categories are defined to the right of the chart. The total number of retweets the Twitter account received was 89.

The topics of the links within retweeted tweets were also analysed (Figure 4.14). Topics were created if more than one link in a retweet related to any specific topic. Tweets containing links relating to the 34th IGC in the news, or photographs from the 34th IGC were the largest proportion at 42% of all retweets containing links.

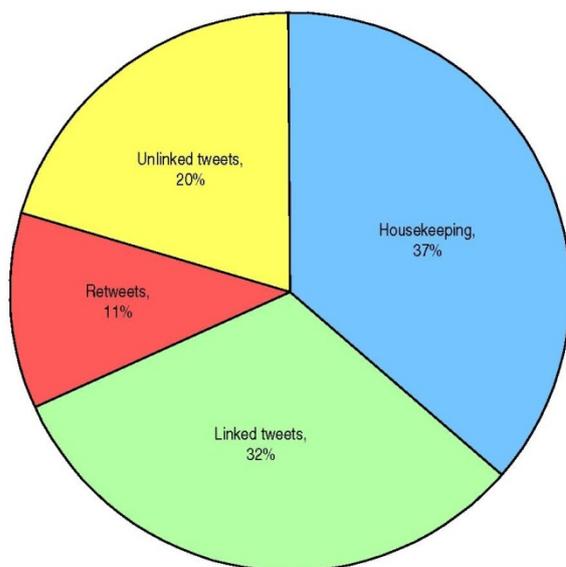
Except for a large spike in the number of mentions between 6 and 9 August, mentions of the 34th IGC Twitter account stayed fairly low and constant throughout the entire managing and monitoring period. Mentions were also broken into category (Figure 4.15). Examining the breakdown of the types of mentions and the topic of the retweets that contained links, it can be seen that the 34th IGC in the media was a major topic of tweets. It accounted for 11% of mentions and 42% of the links in our tweets that were retweeted. This was likely a reflection of who was managing the account during the 34th IGC, Rowland, whose expertise and background were in media releases and the news-cycle.



- Mining**
Contained links related to either mining or minerals
- Energy**
Contained links related to energy or carbon
- Natural Hazards**
Contained links to natural hazards
- Other Earth Sciences**
Original tweets that did not contain links to further information
- IGC News / Photographs**
Contained links related to the 34th IGC in the media or photographs of the 34th IGC

12-6806-4.16

Figure 4.14: The 34th IGC Twitter account's tweets that contained links and were retweeted broken down by the topic of the link. Topics are defined next to the pie chart. The total number of retweets with links was 28.



- Housekeeping**
Tweets that related to important dates, deadlines or sessions before and during the 34th IGC.
- Linked tweets**
Original tweets that contained links to further information
- Retweets**
Tweets that the 34th IGC account retweeted
- Unlinked tweets**
Contained links to other earth science topics not covered by the other categories

12-6806-4.15

Figure 4.15: Mentions of the 34th IGC Twitter account by category. Categories are defined next to the pie chart. The total number of mentions the Twitter account received was 133.

Further, when examining the surge of people talking about the 34th IGC on Twitter, i.e. the increase in the use of the official hashtag, it became apparent that a majority of the users of the hashtag were not from individual delegates themselves but from the companies who were running the stalls and booths, or by people representing these companies. Figure 4.15 reveals that 12% of all mentions were potential conversations, usually in the form of inquiries. These inquiries were not responded to, and a majority of these occurred during the congress. These mentions represented a potential opportunity to drive user interaction during the congress and were not fully utilised.

4.5.4.2. Facebook

It can be seen that photos were by far the most popular medium that was interacted with by fans on the 34th IGC Facebook page (Figure 4.16). This is because the Facebook platform is a visual form of communication. The popularity of photographs was recognised early and therefore, introduced the photo competitions to promote interaction from fans. Also of note, the second most popular medium to interact with was links, which is consistent with Twitter interactions.

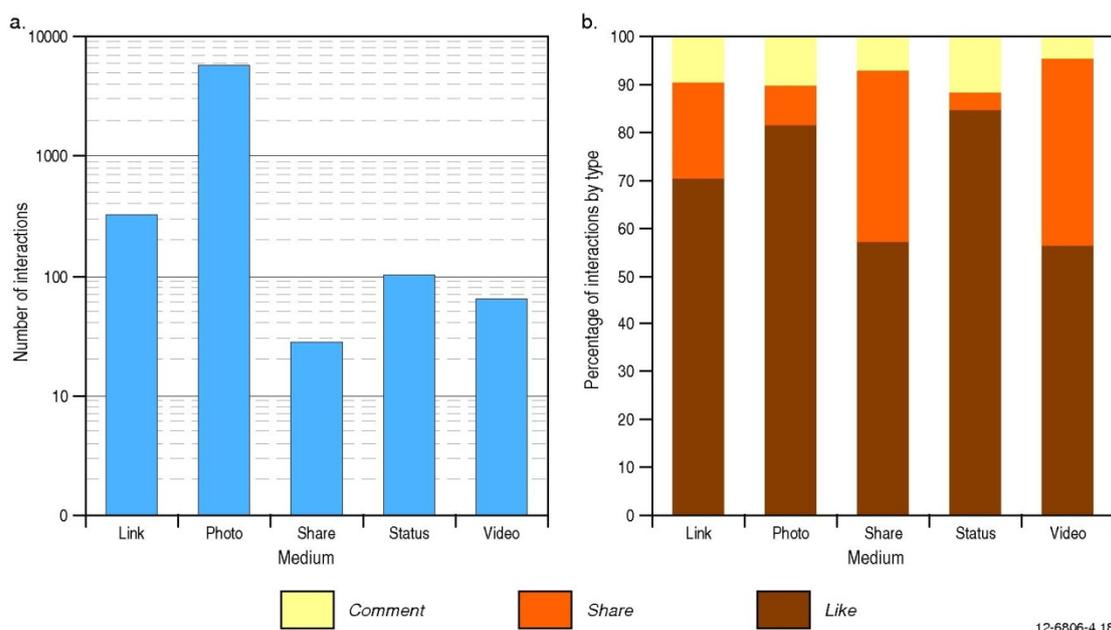


Figure 4.16: Interactions for the 34th IGC Facebook page broken down by medium (Link, Photo, Share, Status, Video). A) The total number of user interactions for each medium. B) The breakdown of interactions for each medium by type as likes, comments and shares. Share as a content type refers to stories created on other pages that were shared through the 34th IGC Facebook page.

The most popular form of interaction by fans was to like content and the least popular was to comment. This is probably because liking something shows approval but doesn't take much time compared with commenting on something. Notably, the most common medium that was shared was stories that were already shared by us, followed by videos.

4.5.5. Negative Interaction

Figure 4.15 illustrates that not all interactions were positive. These were divided into two categories: spam and negative content. Spam was generic interaction that usually tried to get admins of the accounts to click on links that would download malware or spyware content onto their computer, and is dealt with in more detail in the Section 4.5.6. Spam was generic and not directed at the 34th IGC as an organisation. The other style of negative interaction involved people making negative comments on either the 34th IGC as an organisation, or topics that were discussed at the 34th IGC. The process of dealing with these was on a case-by-case basis and could be time consuming (see Appendix Five). It usually involved either ignoring the comment, posting content separately that countered the views in a non-escalating manner, or reporting particularly offensive interactions to Facebook or Twitter.

4.5.6. Trouble Shooting

Through the course of managing and monitoring the social media accounts several problems were encountered when working with social media, these problems and potential solutions, are summarised in [Table 4.5](#).

Table 4.5: Problems encountered during the project and their solutions.

Problem	Solution
Locked out of the Facebook page as more than one person was logged in using the same details. This was never a problem with Twitter.	Making each of the managers an administrator of the page, instead of using a single generic account. This requires each manager to have a personal account. The managers used their own personal accounts in the end but this may blur the boundaries of private versus public usage too much as a permanent solution. It should be possible for people to create a separate work Facebook account, in theory, but this would violate one of the Facebook Terms and Conditions of each person only having one Facebook account.
Difficult to search and navigate for interesting tweets to retweet.	Google Reader was used to create RSS feeds for news articles from particular sites or containing relevant phrases (e.g. climate change, Iain Stewart). Hootsuite's capability to show multiple feeds of tweets meant that hashtags like #geology and #science could be followed simultaneously without separate searches and made it easier to retweet tweets containing these keywords too.
Tweets are no longer searchable or visible after seven days.	Hootsuite keeps a copy of all tweets, retweets and mentions that a Twitter account receives but it does not archive tweets that contain specific hashtags when using the free version. During the congress we used Google Reader to keep a copy of all tweets that contained #34igc. The format of this was not very workable though. It is possible to get a professional account on Hootsuite at a cost (starting at \$9.90/month) and that this account does allow archiving and access to more powerful analytical tools. However, given that GA has a web development section it would also be possible to build an automatic archiving database using Twitter's Streaming and Search APIs. This was attempted during the project but was outside the area of experience of the graduate involved and never accomplished.
Both the Twitter account and Facebook account received spam.	These were always from accounts that had very few followers themselves and usually contained a link with a vague comment like 'This is about you' or a comment completely unrelated to the 34 th IGC. Links from these kinds of posts were never clicked, and offenders were reported.

4.6. Conclusions

The 34th IGC social media campaign was effective in reaching a large proportion of 34th IGC delegates and was used both to promote the 34th IGC and send messages to delegates. Assuming all the followers and fans of the accounts actually attended the congress, the social media and advertising strategy managed to reach approximately one out of every twenty delegates through Twitter and one out of every five delegates through Facebook. The Facebook and Twitter platforms were effective tools for promoting an international conference, as they reached a global audience. However, despite being an excellent one-to-many communication tool in the lead-up to the congress, the social media platforms were not used to their full capacity during the 34th IGC.

Once a critical number of fans or followers had been reached, in this case 400 for Facebook and 100 for Twitter, the pages started to generate their own content through user interaction. Advertising the

social media pages was crucial for building this fan base and was done through the global mailing list; hyperlinked icons on the 34th IGC webpage; advertisement in the circulars; and, advertisement at the conference itself.

Facebook and Twitter are different platforms, resulting in different user interactions. This highlights that they require different approaches for posting content and interacting with people. Twitter had much greater interaction during the event, lending itself to real-time events and breaking news. Additionally, content posted on Twitter was more likely to be interacted with if it included links to further information. On the other hand, Facebook was more popular in the lead-up to the 34th IGC. Overall, Facebook interaction was more sustained with sharp sporadic increases due to sharing interesting content and Facebook content was more popular if it was posted along with a photograph. These differences need to be considered when setting up a social media account because depending on the purpose it might be pertinent to use one platform over another.

4.7. Recommendations

The following recommendations should assist organisations in implementing their own social media campaign:

1) Advertisement of the social media accounts is essential

Simply put; if people don't know that the social media accounts exist, they are not going to interact with them. Building up a follower and fan base is a slow process that can be assisted by advertisement. Advertisements can be placed on associated websites, pamphlets, brochures, posters, print outputs, and presentations belonging to the agency.

2) Twitter and Facebook are different social media platforms; therefore they need to be managed differently

Twitter is a highly interactive real-time platform that requires near constant management and monitoring to be affective. Facebook requires a different time management approach where the quality of the content tends to be more visual.

3) Implement an action plan for negative interaction

It is important to respond to negative interaction quickly and succinctly without escalating the issue. Most social media failures are either due to not responding to negative interaction or taking too long to respond to negative interaction. Create a social media decision tree to assist content managers and monitors when responding to comments and posts.

5. Overall Conclusions

Although many of the effects of hosting the 34th IGC in Australia are intangible and often difficult to measure, the following observations emerged through the present study:

- The national-scale benefits expected as a result of hosting the 34th IGC include: increased tourism revenue, increased awareness of Australian geoscience internationally, increased academic production through journal article publications and increased public awareness of the geosciences.
- Hosting the 34th IGC in Australia represented a significant investment in the geosciences of the nation by a number of different parties including the Australian Government and industry.
- GA's close relationship with the 34th IGC was perceived to increase the national and international reputation of the agency, as it was able to showcase its capabilities on the unique international stage that the 34th IGC provides.
- Attendance at the congress was highly valued by GA delegates across all fields of their involvement and their attendance at the conference was considered a great personal development opportunity. Furthermore, attendance by GA delegates arguably enhanced GA's capability to provide sound advice to the Australian Government.
- The use of social media provided a valuable avenue to engage with globally distributed congress delegates in the lead-up to the congress.

In summary, it was concluded that hosting the 34th IGC within Australia was of great benefit to geosciences within Australia at the national scale, to GA as an organisation, and to the individuals who attended the congress as delegates. Consequently, future conferences of a similar nature should be considered potentially valuable at an agency level and should be pursued. Thorough documentation of agency involvement in such conferences would enable a more complete cost-benefit analysis to be performed; however, substantial additional resources would be required.

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Appendix One: Pre-34th IGC Survey Questions

SURVEY QUESTIONS:

GA U-number (for survey matching purposes only)

1. Which APS level are you in GA?
APS 1-4
APS 5-6
EL1
EL2.1-2.6
EL2.7
2. Please rank the importance of the following conference activities for your attendance at IGC?
Facilitating a workshop
Participating in a workshop
Facilitating a field trip
Participating in a field trip
Chairing a session
Presenting a talk
Presenting a poster
Attendance at other talks / poster sessions
Attendance at a related meeting
Networking amongst peers
Promotion of Geoscience Australia
Career opportunities
Other _____
3. Has your involvement in the IGC affected your job satisfaction?
(strongly positive, positive, no impact, negative, strongly negative)
4. Do you have any comments relating to how your involvement in the IGC has affected your job satisfaction? Include any specific examples of IGC components that have either increased or decreased your job satisfaction.
5. What other projects have you been involved with that will be delivered at IGC? Examples might include the release of datasets or products such as the IGC book (Shaping a Nation: A Geology of Australia) or field trip documentation.
6. How much time have you invested towards the IGC (e.g. How many hours per week for how many weeks)?
7. What do you expect to get out of IGC?

8. Have you or will you have liaisons with one or more of GA's stakeholders at the IGC? If so, please provide details.
9. Is your section hosting non-GA participants of the IGC before and/or after the congress? Will the visitor(s) be giving a talk and/or be involved in a workshop at GA? Please give details.
10. Do you have any other comments related to GA's participation in the IGC?

Appendix Two: Post-34th IGC Survey Questions

SURVEY TWO QUESTIONS:

GA U-number (for survey linking purposes only)

1. Which APS level are you in GA?

APS 1-4

APS 5-6

EL1

EL2.1-2.6

EL2.7 or above

2. How long have you worked at GA? (Please pick one of the following options)

less than 1 year

1 to 5 years

5 to 10 years

10 to less than 15 years

15 to less than 20 years

20 years or more

3. Reflecting on your time at the IGC. Please rank the importance of the following conference activities in terms of how they affected your job satisfaction?

*Ranking buttons from Strongly Positive, Positive, No Impact, Negative, Strongly Negative
(KEEP SAME FORMAT AS SURVEY 1)*

Facilitating a workshop

Participating in a workshop

Facilitating a field trip

Participating in a field trip

Chairing a session

Presenting a talk

Presenting a poster

Attendance at other talks / poster sessions

Attendance at a related meeting

Networking amongst peers

Promotion of Geoscience Australia

Career opportunities

Other _____

4. Reflecting on your time at the IGC. Please rank the importance of the following conference activities in terms of how they affected your capacity to perform your 'Business-As-Usual' job requirements?

Ranking buttons from Strongly Positive, Positive, No Impact, Negative, Strongly Negative (KEEP SAME FORMAT AS SURVEY 1)

Facilitating a workshop

Participating in a workshop

Facilitating a field trip

Participating in a field trip

Chairing a session

Presenting a talk

Presenting a poster

Attendance at other talks / poster sessions

Attendance at a related meeting

Networking amongst peers

Promotion of Geoscience Australia

Career opportunities

Other _____

5. Please choose the most appropriate answer to the time you invested towards the IGC (in terms of preparation beforehand).

Invested time was appropriately recognised in section work plan

Invested time was appropriately recognised in my PDP

Invested time was appropriately recognised in both my section work plan and my personal PDP

Invested time was recognised in either section work plan or PDP but was underestimated

Invested time was not recognised in either the section work plan or PDP and the time invested was in addition to Business-As-Usual duties.

6. Given that attendance at the IGC is a form of Learning and Development (L&D), if you had the opportunity to re-direct the funding for your attendance at the IGC (for instance registration costs for the conference, workshops, fieldtrips where applicable), do you feel that there exists a similar/alternate L&D avenue that would have had a greater impact on your job satisfaction or capacity for 'Business-As-Usual'?
7. Do you consider that you had the right balance of attendance at presentations, workshops and field trips? If not, in hindsight how would you alter your priorities?
(Yes/no) (free text box)
8. Did your section/group host any workshops or seminars at GA, either before or after the IGC that were associated with the IGC?
(yes/no option plus an obligatory free text box, Please expand on your answer)
9. Please rate the feedback you receive from IGC delegates on GA's involvement in the IGC.
Strongly negative, negative, neutral, positive, strongly positive

Please describe

10. Please rate the GA booth at the exhibition hall (e.g. WOrld-wind display, IGC book, Uluru field guide, Aster datasets, etc.).

Strongly positive, positive, neutral, negative, strongly negative

Please describe

11. Do you have any other comments related to GA's participation in the IGC?

12. What are the impacts, for Australia, of hosting the IGC? Please describe.

(free text box)

Appendix Three: Geoscience Australia's involvement in the scientific program of the 34th IGC

GA staff members coordinated themes, chaired sessions, or delivered keynote presentations for 19 out of 37 Symposia Themes at the 34th IGC (~50%) and the details are given below.

Themes	Sessions	Role(s)	Staff Member(s)
Theme 4: Environmental Geoscience	4.2 Global geochemical mapping: understanding chemical Earth (The 2 nd Arthur Darnley Symposium) 4.3 Advances in the evaluation and interpretation of geochemical data at the continental scale	Session Coordinator	Patrice De Caritat
Theme 5: Geoscience Information		Theme Convenor	Lesley Wyborn
Theme 6: Energy in a Carbon Constrained World	6.2 Geothermal resources	Session Coordinator	Anthony Budd
Theme 7: Mineral Resources and Mining	7.1 New age metals: the geology and genesis of ores required for a changing economy and a carbon constrained world [Society for Geology Applied to Mineral Deposits (SGA)]	Session Coordinator	David Huston
	7.7 Qualitative and quantitative methods of assessing undiscovered mineral resources	Session Coordinator	Subhash Jaireth
Theme 8: Mineral Exploration Geoscience	8.1 Footprints of mineralised systems: new concepts and data for exploration	Session Coordinator	Roger Skirrow
	8.5 Exploration and discovery: diagnosis and prognosis -- are we in need of cure? [Society for Geology Applied to Mineral Deposits (SGA)]	Session Coordinator	David Huston
	8.3 Probing the Earth from near-surface to the mantle - techniques, modelling software and case histories to aid mineral exploration	Session Coordinator Session Coordinator	Richard Lane Ned Stolz
Theme 10: Coal - A Myriad of Resources	10.2 Coal - a record of change	Session Coordinator	Robert Langford
Theme 11: Petroleum Systems and Exploration	11.1 Petroleum prospectivity of divergent and transform passive margin basins of North and South Atlantic, Arctic, India and Australasia	Theme Convenor	Marita Bradshaw
	11.5 Petroleum exploration in frontier basins	Session Coordinators	Marita Bradshaw and Irina Borissova
	11.6 Putting the geo into geophysics - adding clout through better datasets and joint interpretation	Session Coordinator	Ron Hackney

Themes	Sessions	Role(s)	Staff Member(s)
Theme 14: Basin Formation and Continental Margin Processes	14.4 Passive to hyper-extended continental rift margins in the geological record: their recognition, diagnostic elements and comparison with present-day analogues	Theme Convenor and Session Coordinator	George Gibson
Theme 18: The Proterozoic Earth	18.1 Building the Australian continent	Session Coordinator	Richard Blewett
Theme 22: Metamorphic Rocks and Processes	22.2 Rates of metamorphic processes	Session Coordinator	Geoff Fraser
Theme 23: Evolutions of the Biosphere	23.1 Martin Glaessner Symposium: The Ediacaran and the Cambrian Explosion	Theme Convenor and Session Coordinator	John Laurie
Theme 25: Marine Geoscience and Oceanography	25.5 Geoscience applications for ocean management and also for supporting jurisdictional claims under the United Nations Law of the Sea	Session Coordinators	Andrew Heap and Mark Alcock
Theme 26: Antarctic and Arctic Geoscience	26.4 Rodinia to Gondwana: evolution of the southern supercontinent	Session Coordinator	Chris Carson
Theme 28: Groundwater/ Hydrogeology	28.3 Geoscientific mapping, characterisation and conceptualisation of hydrogeological systems	Theme Convenor and Session Coordinator	Ken Lawrie
	28.4 Groundwater for energy and mining	Session Coordinators	Ken Lawrie and Jon Clarke
	28.5 Hazards and risks to groundwater systems	Session Coordinators	Ken Lawrie and Steven Lewis
Theme 30: Geohazards	30.2 Natural hazards and climate change	Session Coordinators	Bob Cechet and Martyn Hazelwood
	30.5 Geohazard risk analysis: the state of the art	Session Coordinator	Jane Sexton
Theme 32: Geoscience Information from Proximal and Remote Sensing Technologies		Theme Convenor	Adam Lewis
Theme 34: Major Geoscience Initiative, Geosurveys and Maps		Theme Convenor	Dr Ian Lambert
Theme 36: Regional, Thematic and Specialist Symposia	36.7 Geoscience research and concepts from Asia and environs	Theme Convenor and Session Coordinator	Dr Ian Lambert
		Session Coordinator	Paul Kay
	36.4 Geoscience challenges in the 21 st century: an early-career perspective [YES Network]	Session Coordinator	Michelle Cooper

Themes	Sessions	Role(s)	Staff Member(s)
F.2: International GeoSurveys Forum – Applying geoscience to address the world’s major challenges			Dr Chris Pigram (CEO Geoscience Australia)
F.3: Global Geoscience Initiative (GGI) – Developing a Geoscience Roadmap as part of the Belmont Forum			Dr Chris Pigram (CEO Geoscience Australia)

Appendix Four: Breakdown of Recommendations from Chapter 3

Category	Recommendation	Questions / Comments	Potential Cost	Possible Timescale
Further Investigation	Examination of the new online L&D form	How many GA employees completed the L&D form? Is there additional information for analysis?	Low	Short
	Survey of non-34 th IGC participants	How many hours in preparation for GA's 34 th IGC activities? What exposure to 34 th IGC related information dissemination?	Low/Medium	Short
	Survey of GA employees that attended workshops	How did workshop attendance increase skill-set and capacity for BAU activities?	Low	Short
	Future survey using control group – examine a section with a strong 34 th IGC focus	How do 34 th IGC participants compare with non-34 th IGC participants in terms of capabilities for BAU activities? What are the long-term impacts on BAU capabilities and job satisfaction?	Medium	Mid
Future Conferences	Pre- and post-conference 'mini' sessions	Dissemination of GA employee presentations to non-conference attendees within GA	Low/Medium	Ongoing
	External visitors to GA	Formal processes for documentation and dissemination of information e.g. Intranet table for visitors	Low/Medium	Ongoing
	Formal GA involvement	Initial proposal / project document to have clear outlines of outcomes against which the activity can be judged	Medium	Long
Organisational Processes	Formal recording of information from Overseas Report – used in L&D assessment.	International conferences are recorded via Overseas Report. This information should be collated and examined for assessment of L&D value	Low/Medium	Medium/Long
	Some form of reporting for domestic conferences	Currently no formal recording of attendance at domestic conference, aligned with Overseas Report.	Medium	Medium/Long

Category	Recommendation	Questions / Comments	Potential Cost	Possible Timescale
	Possible use of the 'purpose' field in Travel Allowance Form for L&D	Do GA employees complete L&D forms for all L&D activities? Could the 'purpose' field in the Travel Allowance form be used to capture information? Alternatively, could L&D form completion become a mandatory requirement prior to the authorisation of Travel Allowance?	Low	Short/Medium/Long
	Similar process of value assessment of external L&D programs as used for internal	Currently no processes for the evaluation of conference attendance. Could conferences be evaluated in terms of their L&D contribution?	Medium/High	Medium/Long
	Formal guidelines / SOP for administering a survey within GA	Surveys are an important mechanism for testing the 'pulse' of the organisation. There are currently no guidelines or operating procedures for producing a survey within GA. This practice is not managed, is currently administered ad-hoc.	Medium	Medium

Appendix Five: Content Manager and Monitoring Guidelines for the 34th IGC Facebook and Twitter Accounts

The following information details how the social media pages were managed daily.

Twitter Content Management

The content on Twitter was restricted by the 140 character limit and was predominantly plain text with shortened links to photos, articles, podcasts or videos.

If the Content Manager created an original tweet they were expected to follow these guidelines:

- The Twitter account should be consistent with the Facebook account, so any original posts on the Facebook account should be shortened and translated into a tweet;
- Original tweets should be no more than 137 characters long so that it can be retweeted by other Twitter users. When a twitter user retweets, the string 'RT ' precedes the original tweet. Thus a tweet any longer than 137 characters cannot be readily retweeted limiting its potential reach;
- Tweets should include the official hashtag of the 34th IGC, '#34igc';
- Tweets should be structured as a hook to get followers or potential followers interested and provide a shortened link, using the following web service ow.ly/url/shorten-url, so that readers can find out more; and,
- Any words within the tweet that could be considered keywords or a topic should be preceded by '#', e.g. #geology.

If the Content Manager was retweeting they were expected to follow these guidelines:

- Retweet anything of interest and relevant to the earth sciences.
- If there is a link in the original tweet, follow it to see if it works, it is from a reputable source and is not spam; and,
- Add in the 34th IGC hashtag '#34igc'. If there is no room for this in the original tweet attempt to shorten the original tweet so that it has the same meaning but includes the hashtag. It is not possible to edit tweets using Twitter's retweet function so the Content Manager is encouraged to use Hootsuite to manage the content of the Twitter account, as this service did have the capability (see [Section 4.4.1.1](#)).

If the Content Manager received a tweet from a follower regarding the 34th IGC or one of their posts were expected to follow these guidelines:

- If it is positive respond appropriately in a colloquial, but non-offensive manner. This may involve providing a link to further information or recognition of their inquiry;
- If their tweet is negative notify supervisors immediately to formulate the most appropriate response; and,

- To interact and have a conversation with the Twitter user, put a '@' before their username without a space.

It was important for tweets to be uploaded on Twitter throughout the day so that the account did not appear to be poorly managed, with tweet and retweets aggregated at one time of the day. This was done either by logging in at multiple different times during the day, or logging into Hootsuite for one session and using its scheduling capabilities to stagger tweets and retweets at random times throughout the day.

Facebook Content Management

Facebook content was generally plain text of any length with embedded web page links to further content, photographs, movies or audio/visual recordings. The Content Manager was encouraged to post updates or content on the Facebook page only once a day.

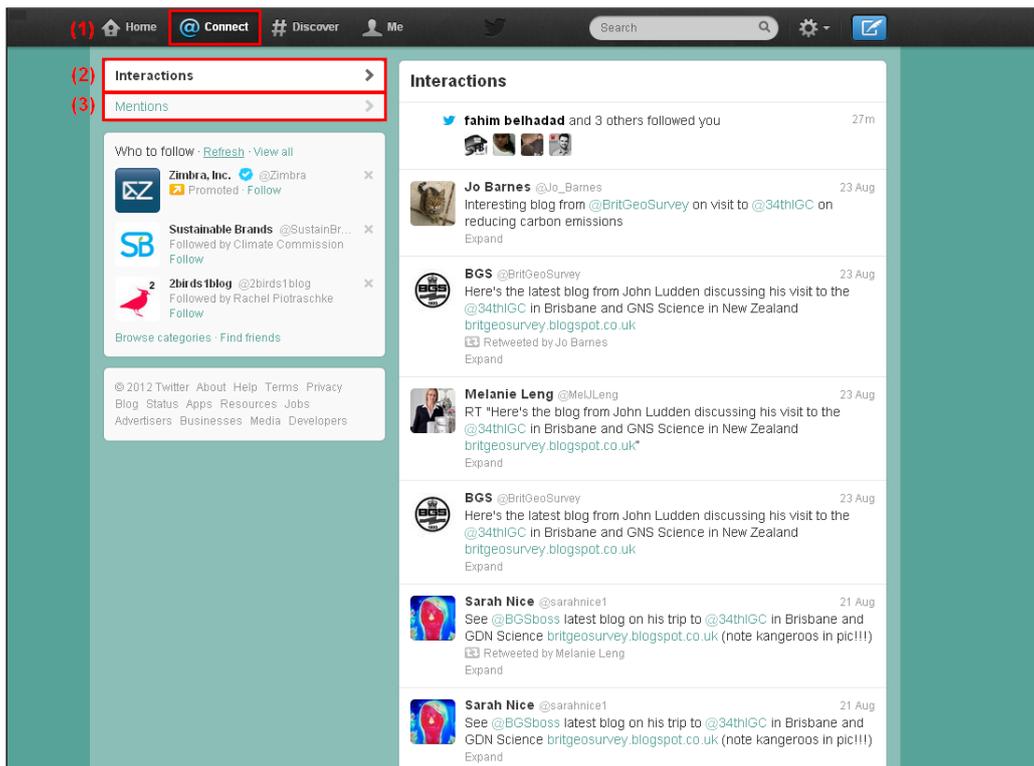
The following simple guidelines were used by the Content Manager when posting on Facebook:

- One news article/photograph/video should be posted a day with updates on housekeeping and fieldtrips additional to the news story;
- Like everything that another person posts on the page. This is the easiest way of acknowledging them (photos, links, wall posts). Individual responses are written if someone asks a question to the 34th IGC;
- If someone posts a photo to the page, it is put into the 'Share your favourite geoscience photos' album. This is done by saving the photograph to the desktop and uploading it to the album. Captions should be copied over too;
- Each Friday download the Facebook Insights report;
- Post two field trip photographs in the focus album each week until fieldtrip registration closes.

Twitter Content Monitoring

The following information was recorded within the Twitter section of the monitoring report:

- Number of followers - this was a cumulative measurement, not a measurement of daily new followers;
- Number of retweets for the preceding day - this number was found by clicking on the '@Connect' tab and then the 'Interactions' tab when logged into the 34th IGC Twitter account or by examining the 'My tweets, retweeted' feed in 34th IGC Hootsuite account; and,
- Number of mentions for the preceding day - this was found by clicking on the '@Connect' tab and then the 'Mentions' tab when logged into the 34th IGC Twitter account or by examining the 'Mentions' feed in the 34th IGC Hootsuite account.



Screenshot of the Twitter page. Red box (1) shows the location of the '@ Connect' tab; red box (2) show the location of the 'Interactions' tab; and red box (3) shows the location of the 'Mentions' tab.

Facebook Content Monitoring

The following information was recorded within the monitoring report (Table 4.2):

- Likes of page – new number of page likes counted for each day, found in the 'New Likes' panel;
- Number of wall posts by us – new wall posts posted by the Content Manager, found in the 'Insights' tab under 'page posts';
- Number of wall posts by fans – unique wall posts by fans of the 34th IGC Facebook page, found in the 'Notifications' tab;
- Likes of wall posts – new likes of wall posts, found in the 'Notifications' tab
- Number of shares by fans – count of shares by fans, found under each story on the page wall; and,
- Number of shares by us – shares by 34th IGC of other Facebook content with our fans.

The screenshot shows the Facebook interface for the International Geological Congress (IGC) page. At the top, there is a search bar and navigation links. The Admin Panel is visible, with three tabs highlighted by red boxes: (1) Notifications, (2) New Likes, and (3) Insights. The Notifications tab shows recent activity, including a post by Malanie Banney and a photo by Jamshid Ali Turi. The New Likes tab lists users who recently liked the page, such as Prabhakar Dutta and Gehad Nassef. The Insights tab displays a line graph showing performance metrics like 'Your Posts', 'Talking About This', and 'Reach'. The main content area features a large banner for the 34th International Geological Congress (IGC) in Brisbane, Australia, with the theme 'Unearthing Our Past And Future – Resourcing Tomorrow'. The banner includes a circular logo with the text 'XXXIV GEOLOGORUM CONVENTUS AUSTRALIA MENTE ET MALLEO' and a background image of a desert landscape with Uluru. The right sidebar contains a 'See Your Ad Here' section with a similar banner and a 'Promote Your Page' button.

Screenshot of the Facebook page. Red box (1) shows the location of the 'Notifications' tab; red box (2) shows the location of the 'New Likes' tab; red box (3) shows the location of the 'Insights' tab.